FRED L.M. PATTISON

Fred Pattison was born in Scotland, where he received his early education before going to the University of Cambridge in 1941 for undergraduate work in Natural Sciences, followed by a Ph.D. in Organic Chemistry. He then spent a year at Dalhousie University as Lecturer before joining the faculty here at UWO as Assistant Professor in 1948.

He established a Ph.D. program in the department, and his research on biologically active organic fluorine compounds resulted in many publications, the award of an Sc.D. by the University of Cambridge, and 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 complete career change, and at the age of 42 he enrolled at UWO as a first-year.

On completing his M.D. four years later, he interned at St. Joseph's Hospital here in London and served for a year as resident in the Family Practice Program; he also took a diploma course in venereology at the University of Liverpool. In 1971-73, Fred followed up a long-standing interest in Canada's North people by working with the International Grenfell Association. He provided solo medical care for about 6,000 people scattered along 120 miles of the Atlantic coast of Newfoundland.

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

On his retirement, Fred was able to resume his connection with the Chemistry Department with the rank of Professor Emeritus. In view of Fred's long service and many contributions to chemistry and medicine at UWO, it is entirely fitting that the department should have a lecture series bearing his name.

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, Univ. of Cambridge
1997	Anthony J. Kirby, Univ. of Cambridge
1998	Larry E. Overman, Univ of California, Irvine
1999	J. Fraser Stoddart, Univ. of California, L.A.
2000	Dennis Curran, Univ. of Pittsburgh
2001	Joseph Lambert, Northwestern Univ.
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 Buenos Aires

Lecture 1: Monday, May 7th, 2007
in 114, Main Floor, North Campus Bldg., 3:00 p.m.

"A Multi-dimensional Approach to Molecular Recognition in Chemistry and Biology: Towards New Therapies against Infectious Diseases"

Lecture 2: Tuesday, May 8th, 2006
in 114, Main Floor, North Campus Bldg., 3:00 p.m.

"Acetylene and Fullerene Scaffolding: Carbon-rich Advanced Materials"

Lecture 3: Wednesday, May 9th, 2006
in 114, Main Floor, North Campus Bldg., 3:00 p.m.

"Organic Nanochemistry: From Dynamic Supramolecular Systems to Functional Nanopatterned Surfaces"

Light Snacks/Refreshments will be served at 2:45 p.m. inside the lecture room

CONTACT:
Dr. James Wisner (519) 661-2111 ext. 86864
jwisner@uwo.ca

Sandy McCaw (519) 661-2111 ext. 86350
smccaw@uwo.ca

Our website: http://www.uwo.ca/chem/

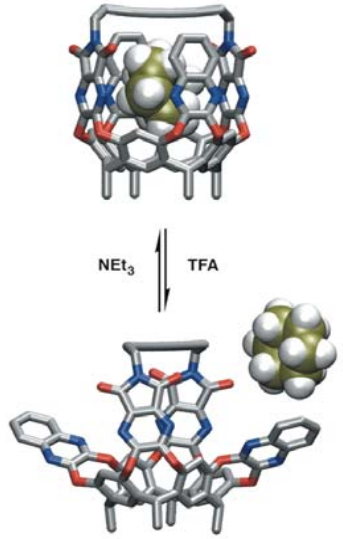
Western

The UNIVERSITY *of* WESTERN ONTARIO

The Fred Pattison Senior Lecturer in Chemistry *for* 2007

FRANÇOIS DIEDERICH

Distinguished University Professor



London, May 7th - 9th, 2009
North Campus Building
3:00 p.m.

FRANÇOIS DIEDERICH

François Diederich (b. 1952) is a native of the Grand-Duchy of Luxembourg and received his diploma in 1977 and his doctoral degree (Dr. rer. nat.) in 1979 from the University of Heidelberg. In his Ph. D. thesis under guidance of Prof. Heinz A. Staab, he accomplished the synthesis of kekulene. In following postdoctoral studies at the University of California at Los Angeles (UCLA) from 1979 to 1981 with Professor Orville Chapman, he worked on preparation, isolation, and reactivity of dehydronaphthalenes in Ar matrices. Subsequently, he became a research associate at the Max-Planck-Institute for medical research in Heidelberg. In this period, he started his molecular recognition studies with cyclophane receptors in aqueous solutions. After his habilitation in 1985, he joined the faculty of the Department of Chemistry and Biochemistry at UCLA as an associate professor (1985-1989) and as a full professor (1989-1992). At UCLA, he initiated his ongoing research on synthetic carbon allotropes and carbon-rich advanced materials. Since April 1992, he is a professor of organic chemistry at ETH Zürich. At ETH, he expanded his molecular recognition studies to a multidimensional approach including the investigation of protein-ligand interactions and prepared dendrimers with functional cores as models for globular proteins. He received the Otto Hahn Medal of the Max- Planck-Society (1979), the Dreyfus Teacher-Scholar Award (1987), the ACS Arthur C. Cope Scholar Award (1992), the Otto-Bayer-Preis für Chemie (1993), the Janssen Prize for Creativity in Organic Synthesis (2000) and the Havinga Medal (2000), the Humboldt Research Prize (2005), the Burkhard-Helferich Prize (2005), the August-Wilhelm-von-Hofmann-Denkmünze (GDCh, 2006), and the ACS Ronald Breslow Award for Achievements in Biomimetic Chemistry (2007). He is a member of the Deutsche Akademie der Naturforscher Leopoldina, the American Academy of the Arts and Sciences, the Berlin-Brandenburgische Akademie der Wissenschaften (BBAW), and the Real Academia Española de Ciencias. Work in the Diederich group, which usually comprises ca. 25 doctoral, 10 postdoctoral, and 5 undergraduate researchers, has been documented in more than 500 original publications.

Professor Diederich will give three lectures:

Lecture 1: Monday, May 7, @ 3:00 p.m., NCB 114, Main Floor

A MULTI-DIMENSIONAL APPROACH TO MOLECULAR RECOGNITION IN CHEMISTRY AND BIOLOGY: TOWARDS NEW THERAPIES AGAINST INFECTIOUS DISEASES

We have pursued since the early 1990s a molecular recognition-based approach to medicinal chemistry. Starting from the observation of an unfamiliar intermolecular contact seen in the X-ray crystal structures of protein-ligand complexes obtained in our medicinal chemistry programs, which target malaria and other important diseases, we undertake data base mining in the Cambridge Crystallographic Database (CSD) and the Protein Data Bank (PDB) to explore the statistical relevance of the contact. If this contact is of a more general nature, we quantify it - depending on its energetic magnitude - by protein-ligand binding studies, molecular recognition studies with synthetic receptors or, if very weak, by studying intramolecular dynamic processes in designed model systems. Examples discussed in the lecture are fluorine interactions, cation-**B** interactions, and phosphate recognition in biology.

The application of the insight gained into biological molecular recognition phenomena to structure-based drug design will be illustrated by recent lead developments in our programs against shigellosis and malaria.

(i) Inhibitors of tRNA guanine transglycosylase (TGT), a target against Shigellosis. In this program, in collaboration with G. Klebe (Univ. Marburg), we ask the question how to handle crystallographically defined water networks at active sites in lead generation.

(ii) Inhibitors of the plasmepsins, aspartic proteases that the plasmodium parasites uses to degrade hemoglobin. This report on results, in collaboration with Actelion, will focus on the importance of secondary electrostatic interactions and conformational analysis in lead development.

(iii) Inhibition of the enzymes in the non-meyalonate pathway to isoprenoid biosynthesis. Plasmodium species and other important parasites use this pathway exclusively, while it is absent in human. In collaboration with the group of A. Bacher (Univ. Munich), the development of inhibitors against IspF (2-*C*-D-erythritol-2,4-cyclodiphosphate synthase) and the kinase IspE (4-diphosphocytidyl-2*C*-methyl-D-erythritol kinase) is pursued. Noticeably, efficient inhibition of the kinase IspE was possible without occupying the ATP binding pocket.

Lecture 2: Tuesday, May 8, @ 3:00 p.m., NCB 114, Main Floor

ACETYLENE AND FULLERENE SCAFFOLDING: CARBON-RICH ADVANCED MATERIALS

The first part of the lecture describes recent progress in the regio- and stereoselective multiple functionalization of fullerenes. Derivatives of the Tröger base are found to be ideal rigid, chiral covalent templates for tether-directed remote functionalizations, allowing for the first time the diastereoselective formation of optically active bis-adducts with the addends located on opposite hemispheres of both C_{60} and C_{70}. The optical resolution of higher, inherently chiral fullerenes by a sequence of Bingel addition - retro-Bingel reaction is highlighted.

The second part of the lecture reports the construction of new chromophores by acetylenic scaffolding, starting from a versatile library of ethynylated building blocks. Examples for carbon-rich acetylenic macrocycles are perethynylated dehydroannulenes, expanded radialenes, and radiaannulenes. Peripheral donor groups stabilize these delicate, electron-accepting all-carbon chromophores and greatly enhance their optoelectronic properties. The self-assembling properties of tetrathiafulvalene-fused dehydroannulenes are discussed. Subsequently, cyanoethynylethenes and 1,1,4,4-tetracyanobutadienes are introduced as new classes of powerful organic electron acceptors. Among the interesting properties of these new advanced materials are exceptional electron uptake and storage capacity, electronic transitions extending into the near infrared, as well as strong nonlinear optical properties and efficient two-photon absorption cross-sections. Many of these chromophores feature high thermal stability and can be sublimed undecomposed. This has enabled formation of highly ordered thin films for potential device applications. The lecture finishes with the presentation of unprecedented dendritic donor-acceptor molecules, that can be multiply charged in a very large number of reduction steps. New AB-type oligomers have become accessible in a cascade reaction, involving repetitive sequences of [2+2]cycloadditions, followed by retro-electrocyclizations. The regular AB sequence is controlled by the electronic nature of the involved acetylenes that are being functionalized.

Lecture 3: Wednesday, May 9, @ 3:00 p.m., NCB 114, Main Floor

ORGANIC NANOCHEMISTRY: FROM DYNAMIC SUPRAMOLECULAR SYSTEMS TO FUNCTIONAL NANOPATTERNED SURFACES

The first part of the lecture describes the synthesis and photophysical properties of multinanometer-sized oligoporphyrin-fullerene arrays, capable of undergoing an exceptional number of reversible oxidation and reduction steps. STM studies on nano-patterned surfaces of oligoporphyrins with hosting properties are reported. An unprecedented set of experiments reveals the formation of one- and two-dimensional fullerene networks upon evaporation of pristine C_{60} on the preorganized porphyrin monolayers. Repositioning experiments with the STM tip demonstrate that the C_{60} molecules can be easily relocated without disrupting the underlying porphyrin layers. An example for a supramolecular single-molecule rotor, that can be brought to motion using the STM tip, will be presented.

The second part of the lecture introduces resorcin[4]arene cavitands that undergo conformational switching from a contracted *vase* form - capable of guest recognition - to an expanded *kite* form, with a large flat surface. The mechanisms of the conformational switching processes, induced by temperature or pH changes, or metal ion complexation are investigated. A complete picture on the kinetics and thermodynamics of the switching process, including the effects of different solvents, has been gained. Switching of the cavitands is observed both in solution and, unprecedented, also in *Langmuir* monolayers. A molecular switch undergoing large molecular motions, with reversible changes from a 0.7 nm sized contracted to a 7 nm sized expanded form, is presented. This switching can be monitored by fluorescence resonant energy transfer (FRET) as well as by excimer emission. First evidence is presented for the electrochemical switching of a resorcin[4]arene cavitand bearing tetrathiafulvalene moieties at the upper rim. The first container molecules for constrictive cycloalkane binding, a molecular basket and a molecular tube featuring reversible switchable portals for guest uptake and egress, are reported. The thermodynamics and kinetics of guest binding provide new insights into the control of molecular recognition phenomena by solvent effects.