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Kevin Wilkinson



Jean-François Masson

## Annual Report 2008-2009

**Background:** CSACS received funding from FQRNT under the Regroupement Stratégique Programme which began as of January 2002 and ran for 6 years. CSACS became an official McGill Centre in February 2003. Renewal funding of \$412,500 p.a. for 6 years from the FQRNT Regroupement Stratégique Programme was awarded to CSACS in April, 2008.

The Centre governance involves three groups: the Governing Board, the International Advisory Committee (IAC), and the Research Activities Committee (RAC). The membership of these Committees (Appendix 1) is as prescribed by the McGill Centre regulations and the guidelines set out by FQRNT.

**Director.** According to the McGill rules for Centres, the member appointed as Director can serve a maximum of two 3 year terms. Linda Reven has thus completed her terms as Director and a new Director must be appointed according to the procedure outlined in the Centre by-laws (Appendix 2). The McGill VP Research office has initiated this process.

### Centre Activities: 2008-09

The complete list of CSACS/CRMAA activities over the last 7 years can be found on the Centre website, [www.csacs.mcgill.ca](http://www.csacs.mcgill.ca). A monthly bulletin is now published by the coordinator, Petr Fiurasek, to provide information about upcoming and ongoing activities, recent publications and awards. In addition to being distributed by e-mail, the bulletin can be downloaded from the centre website: [www.csacs.mcgill.ca](http://www.csacs.mcgill.ca)

**1. Centre Membership:** Following the renewal of FQRNT funding, CSACS currently has 29 full, 4 associate and 1 collaborator members from 6 Quebec universities. The following 2 researchers were nominated for membership in 2009:

**Kevin Wilkinson** Université de Montreal Polymer self-assembly/environmental chemistry

**Jean-François Masson** Université de Montreal Self-assembled monolayers/nanoparticles

## Annual Report ...

### a. Course and Workshops

In addition to two workshops in the summer, CHEM 634, the CSACS course focusing on characterization techniques, was offered this year with lectures by CSACS scientists-in-residence as well as centre members. Eight graduate students, 3 UdeM students, 5 McGill (4 chemistry & 1 material engineering) were registered and the average attendance was 15 as all Centre members are welcome to attend.

Date	Speaker	Subject	Affiliation
Jan. 9	Federico Rosei	SPM part 1 and SPM part 2	CSACS INRS
Jan. 16	Steven De Feyter	Supramolecular nano-chemistry at surfaces	KUL, Belgium
Jan. 23	Mark Andrews	Photonics materials	CSACS McGill
Jan. 30	Royston Paynter	XPS; theory , practice , case study	INRS
Feb. 6	Alain Pignolet	Thin film oxides characterization (XRD, etc)	INRS
Feb. 13	Ricardo Izquierdo	Organic semiconductor devices	UQAM
Feb. 20	Amy Blum	Molecular Electronics	McGill
Feb. 27	Philippe Guégan	Star-shaped polymers	Univ. of Evry Val d'Essonne, France
March 6	Derek Gray	Liquid Crystalline Order in the Solid State	CSACS McGill
March 13	Chris Barrett	Wet measurements	CSACS McGill
March 20	Antonella Badia	SPR	CSACS UdeM
March 27	Antonella Badia	Langmuir-Blodgett films	CSACS UdeM

### Workshops

June 5, 2008	J. Zhu, S. Essiembre, C. Pellerin	Differential Scanning Calorimetry	CSACS UdeM
June 11, 2008	Mathieu Gosselin	Raman Spectroscopy	Thermo Scientific

Pour plus de détails visitez  
For more details visit us at

[www.csacs.mcgill.ca](http://www.csacs.mcgill.ca)



Mary Anne White

## Annual Report ...

### b. CSACS lecture series 2008-2009

The CSACS lecture series was again coordinated by W. Skene (U. Montreal). There were 5 speakers who gave lectures at 4 of the participating universities. In addition, CSACS publicized other departmental speakers whose research was of strong interest to its members. The five speakers and the universities where they lectured are listed below:

Sept. 9/10, 2008 McGill /UdeM  
 Prof. Mary Anne White, Dept. of Chem, Dalhousie University.  
*Molecular-Based Design Rules for Reversible Thermochromic Mixtures*

Sept. 18/17, 2008 Concordia/UdeM  
 Prof. Bart Kahr, University of Washington  
*Structures and Growth Mechanisms of Rhythmic Precipitates of Simple Compounds*

Sept. 17, 2008 McGill  
 Prof. Berni Hasenknopf, Pierre and Marie Curie University  
 Supramolecular Chemistry With Polyoxometallates

Feb.3/4, 2009 McGill / UdeM  
 Prof. Jillian Buriak, University of Alberta  
*Self-Assembly on Semiconductor Surfaces*

March 24/25, 2009 McGill/UdeM/Sherbrooke  
 Prof. Mark MacLachlan, University of British Columbia  
*Supramolecular Macrocyclic Chemistry - New Materials Through Self-Assembly*

### c. CSACS Annual Meetings

#### 6<sup>th</sup> Annual Meeting, McGill, May 8, 08 7<sup>th</sup> Annual Meeting, UdeM, May 8, 09

The 2008 Annual meeting was organized by Petr Fiurasek at McGill University. In view of our plans to make a formal link with the Eurocore research cluster, Self-Organized Nanostructures (SONS 2), one of the project leaders, John Goodby, a leading expert in liquid crystalline materials, was invited to be the outside speaker. The other lecture showcased the accomplishments of one of our Centre members, Hanadi Sleiman, who has made major research breakthroughs in nanoparticle-DNA assemblies. 125 members and visitors attended and students presented 37 posters.

**John W. Goodby** York University, Heslington, U.K.  
*Transmission and amplification of information and properties in nanostructures liquid crystals*

**Hanadi Sleiman** McGill University  
*Dynamic DNA templates for patterning materials in two- and three- dimensions*

This year's Annual meeting is organized by Will Skene/A. Badia at the Université de Montreal. Another project leader from SONS 2 and a self-assembly polymer researcher, Wolfgang Meier, is the outside speaker. We are again showcasing the accomplishments of a Centre member, Françoise Winnik, who develops polymer self-assemblies for pharmaceutical applications. 145 members and visitors attended and students presented 39 posters.

**Wolfgang Meier**, U. Basel, Switzerland  
 Polymer Membranes with Biological Functions: From Polymer nanoreactors to highly selective water filters

**Françoise Winnik** Université de Montreal  
*How chemistry and the environment control the self-assembly of telechelic amphiphilic polymers.*



Faculty Club, McGill

Faculté d'Aménagement  
U. of M.

## Annual Report ...

### d. CSACS Student Symposium

McGill Sept. 8, 2008



Kevin Yager

There were 80 student attendees at the third CSACS Student Symposium held at the graduate student Thompson House at McGill. Six 30 minute talks and 28 posters were presented. The conference was organized entirely by a committee of graduate students from the affiliated universities. This year the students decided to invite a former centre student member, Kevin Yager, as a keynote speaker. The 2008 speakers and the lecture titles of the 2008 symposium are listed below. The **2009 student symposium** will be held at Sherbrooke.

Keynote speaker: Dr. Kevin Yager, *NIST, Gaithersburg, MD, US.*  
*Directed Self-Assembly of Block-Copolymers: Measurement of 3D Order*

Justin Conway (DeWolf) **Concordia U.**  
*Kinetic and Rheological Investigation of the Effects of Ozone on Lung Surfactant*

Marc-André Gagnon, (Lafleur) **U. of Montreal.**  
*NMR Study of Transport Properties in Curdlan Hydrogels*

Yi Zhao, (Zhao) **U. of Sherbrooke.**  
*Synthesis of Double Side-Chain Liquid Crystalline Block Copolymers using RAFT Polymerization and the Orientational Cooperative Effect*

RenataVyhnalkova (Eisenberg, van de Ven) **McGill U.**  
*Kinetics and Mechanisms of Biocide-Micelle Interactions in Bacterial Deactivation*

Monica Cheung (Cuccia) **Concordia U.**  
*Mirror Symmetry Breaking and Chiral Amplification of Ethylenediammonium Sulfate Crystals*

Rami Hourani, (Whitehead, Kakkar) **McGill U.**  
*Multitask Dendritic Macromolecules: Synthesis, Characterization, and Evaluation of their Structure-Property Relationships using a Combination of Experimental and Theoretical Approach*

### e. CSACS Sponsored Symposia

Upcoming major meetings in Montreal that will feature CSACS/CRMAA sponsored symposia:

The 13th International IUPAC conference on Polymers and Organic Chemistry Montreal, July 5-9, 2009 Symposia organizers are Julian Zhu, Will Skene and Christopher Barrett

Surface forces, interfacial phenomena and colloids, 8<sup>th</sup> World Congress of Chemical Engineering, Montreal, Aug. 23-27, 2009. Symposium organizer is Suzanne Giasson.

ACS Colloid and Interface Meeting, Montreal, 2011, organized by Theo van de Ven. Seven of the sessions will be chaired by CSACS/CRMAA members (Reven, Barrett, Kakkar, Lennox, Giasson).



In May 2008, CSACS sponsored CSC in Edmonton.

## Annual report ...

### f. CSACS Mini Symposiums

The format of the mini-symposiums was changed to rotate among the 4 research axes of the centre in addition to the summer mini-symposium oriented towards industrial users of chemical self-assembly. So far the polymer self-assembly (organized by C. Pellerin) and biomimetic interfaces research axes (organized by L. Cuccia and C. DeWolf) have held mini-symposiums.

#### **Industrial Applications Mini Symposium July 16, 08 McGill University**

Yue Zhao, Sherbrooke

*Photocontrollable Polymer Micelles: Dissociation and Reversible Crosslinking*

Juan Schneider, Nanometrix

*Industrial monolayers: from laboratory to production*

Ashok Kakkar, McGill

*Chemically Engineered Dendritic Macromolecules: On the Way to Designing*

*Intelligent Nanostructures*

#### **Polymer Self-Assembly Mini Symposium December 10, 2008 Université de Montreal**

Robert Prud'homme, Montreal

*Les polyesters dans tous leurs états/The United States of polyester*

Christopher Barrett, McGill

*Self-assembled reversible photo-polymers: from reflectometry to robotics*

Peter Cormack, Strathclyde, Scotland, visiting scientist

*Hyper-crosslinked polymer microspheres*

#### **Biomimetic Interfaces Mini Symposium February 25, 2009 Concordia University**

Gonzalo Cosa, McGill

*Shedding light on self-assembly: Fluorescence microscopy studies on Biomimetic and biological systems.*

Christine DeWolf, Concordia

*Using model membranes to study the effect of pollutants on lung surfactant films*

Philippe Guégan, EvryVal d'Essonne

*Synthesis and study of new Biomimetic cyclodextrin- based nanopores*



Attendance per mini symposium ~ 50

## Annual report ...

### g. CSACS Scientists-in- Residence



Peter Cormack

**Peter Cormack**, a synthetic polymer chemist from the University of Strathclyde was a visiting scientist from Nov. 15 to Dec. 14, 2008. He was hosted by the laboratories of Will Skene and Julian Zhu. In addition to setting up research collaborations and participating in the Polymer Self-Assembly Mini Symposium, he gave well received lectures in graduate courses at both UdeM and McGill.

**Philippe Guégan**, University of Evry Val d'Essonne was a visiting scientist from January 20 to March 4, 2009. He was hosted by the laboratory of Prof. Françoise Winnik and interacted with centre members for collaborative research concerning the synthesis of self-assembling polymers for gene therapy and synthetic pores as well as participating in the Biomimetic Interfaces Mini Symposium.

**Stephen Hyde**, Australian National University in Canberra will be here for at least 6 months (Feb-July 2009) as a visiting scientist, hosted by the laboratory of Suzanne Giasson. He is a theoretician specializing in the self-assembly of complex molecular structures. He pioneered the application of non-Euclidean geometry to two-dimensional problems of membranes and crystal development. He is currently writing another text to build on his earlier book "The Language of Shape".

### h. CSACS Summer Students

In 2005, CSACS initiated a new program to support 5-6 undergraduate summer students (\$4K per student) to work on joint research projects between Centre members. The 2008 program was expanded to recruit foreign students. The goals of the program are to expose undergraduate research students to CSACS research as well as to promote contacts between research groups. Interuniversity projects are encouraged. The students selected for the 2009 program are listed below:

1. Kai Lin Lau *McGill* Cosa/Skene  
Surface grafted conducting and biopolymers (II)
2. Antoine Beauvais-Lacasse *McGill* Perepichka/Rosei  
Synthesis of 2D conjugated polymers
3. Renaud Gillet *U. Pierre et Marie Curie* Kakkar/van de Ven  
Self assembly of linear and hyperbranched macromolecules
4. Jing Jing Xiao *McGill* Eisenberg/van de Ven  
Self Assembly of triblock copolymers
5. David Banville *UdeM* Perepichka/Rosei  
Harvesting Lost Photons : Minimizing Sub-Band gap Losses in Organic Photovoltaic Devices by Up-conversion
6. Cheen Ang *McGill* Barrett/Sleiman  
Polyelectrolyte coated DNA cages

## Annual report ...

### Appendix 1

Governance of the Centre for Self-Assembled Chemical Structures

#### **Governing Board**

Martin Grant- Chair, Dean of Science, McGill

Denis Therien, Vice Principal, Research, McGill or delegate (Rima Rozen - Associate Vice Principal)

Joseph Hubert - Vice Rector, Research, U. Montreal or delegate (Dominique Berube Director, Research)

Linda Reven - Director

Antonella Badia - Associate Director

Yue Zhao – Member

Louis Cuccia - Member

Peter MacDonald - IAC representative

Nasser Mohieddin Abukhdeir - student representative

Andrew Kirk- observer/MIAM Director

#### **International Advisory Committee (IAC)**

Gregory Lopinski, NRC Ottawa

Peter MacDonald, University of Toronto

Miriam Rafailovitch, SUNY at Stony Brook

#### **Research Activities Committee (RAC)**

Antonella Badia (Montreal)

Christopher Barrett (McGill)

Michel Lafleur (Montreal)

Linda Reven (McGill)

Yue Zhao (Sherbrooke)

Louis Cuccia (Concordia)



Peter MacDonald  
IAC representative

## Annual report ...

### Appendix 2

#### BY-LAWS for the Centre for Self-Assembled Chemical Structures

##### 1. Name:

Centre for Self-Assembled Chemical Structures

##### 2. Location:

Otto Mass Bldg. Rm 414

##### 3. Board:

The overall management of the Centre for Self-Assembled Chemical Structures is the responsibility of the governing Board. The Director of the Centre and the Research Advisory Committee are responsible for the day-to-day management. In the event of an extended absence of the Director, the Associate Director will be in charge of managing the Centre.

##### 4. Membership of Board:

The membership of the governing Board will include the Dean of Science (McGill) to which the Centre reports officially, who will act as Chair of the Board, the Vice-Principal (Research) or delegate (McGill), the Dean of the Faculty of Arts and Science (U. Montreal), the Director and several Full Members of the Centre, one postdoctoral or graduate student and, at least, one person from outside the University, not directly involved in the Centre. This Board will meet at least once annually. The terms of appointment of the Board Members, other than those of the University officials, will normally be for three years.

##### 5. Appointment of Director:

The appointment of the Director and Associate Director of the Centre will be the responsibility of the Board. The Board has the right to open a search for a Director, if the Board deems that this is necessary. The appointments of the Director (and Associate Director) will normally be for three years, with the opportunity of renewal once only. The nominations for Director will be made to the Board by a sub-committee consisting of the Vice-Principal (Research) or delegate as Chair, two active members of the Centre and one member of the Board. The position of Director does not automatically carry teaching release with it. Any decision on teaching release is the prerogative of the head of the home unit of the Director or the Dean of the faculty implicated.

##### 6. Annual Report:

The Director will prepare the Annual Report of the Centre, which will include all financial details of the operation, and will present this Annual Report to the Board for approval. The Annual Report will then be submitted to the Office of the Vice-Principal (Research) for further evaluation. If necessary, the Director may be required to make a presentation to the Office of the Vice-Principal (Research) on the details of the Annual Report and the operation of the Centre.

##### 7. Membership in the Centre for Self-Assembled Chemical Structures:

There will be five classes of membership in the Centre:

Full Member, Associate Member, Visiting Member, Postdoctoral Member  
Student (Graduate or Undergraduate) Member.

The ratification of nominations (which must include full curricula vitae and letters of support) for new Full and Associate Members of the Centre is the prerogative of the Board.

##### 8. Research Funding Allocations:

Recommendations for research funding for any Members of the research centre will be made by the Director to the Board. Allocations will be based on recommendations from the Research Advisory Committee of the Centre. The composition of the Research Advisory Committee is the responsibility of the Board. Any appeals against the recommendations of the Director and the Research Advisory Committee will be heard by the Board and its decision will be final.

##### 9. Annual General Meeting:

There will be a General Meeting of all Members of the Centre for Self-Assembled Chemical Structures once a year to discuss the Annual Report. However, only Full Members will be permitted to vote on motions presented.

##### 10. Extraordinary Meeting of Board:

An Extraordinary Meeting of the Board can be convened if the Chair of the Board has been informed, in writing, of such a request and the letter has been signed by at least 2/3 of the Full Members of the research centre.

##### 11. Research Agreements, Contracts and Grants:

The Centre does not have the right to enter into grant or contract agreements without the signatures of the appropriate University signing officer.

##### 12. Dissolution of the Research Centre:

If the Centre no longer satisfies the basic requirements laid down by the University, e.g., insufficient membership, lack of demonstrable research activity, failure to file Annual Reports, or no longer a priority in the strategic plan of the university, the Vice-Principal (Research) can recommend to the Provost and Vice-Principal (Academic) that the Centre be closed.

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