



June 10

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Centre de recherche sur les matériaux auto-assemblés  
Centre for self-assembled chemical structures

Volume 19

## 1) Annual Report 2009-2010

**Background:** CSACS receives 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.y. for 6 years from the FQRNT Regroupement Stratégique Programme was awarded to CSACS in April, 2008.

The complete set of documents related to the governance and by-laws of the Centre are appended to the minutes of the 2002-2003 Annual Report.

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. Prof. Linda Reven has completed her two terms as Director and a new Director has been appointed according to the procedure outlined in the Centre by-laws (Appendix 2). Since September 1, 2009, Prof. Theo van de Ven, Department of Chemistry, McGill, is the new Director of CSACS.

### Centre Activities: 2009-10

The complete list of CSACS activities over the last 8 years can be found on the Centre website, [www.csacs.mcgill.ca](http://www.csacs.mcgill.ca). A monthly bulletin is 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.

## Annual Report (2009-2010) con't.

**1. Centre Membership:** Following the renewal of FQRNT funding, CSACS currently has 33 full, 4 associate and 1 collaborator members from 6 Quebec universities. The following researcher was nominated and approved for membership in 2010:

Prof. Amy Blum, Department of Chemistry, McGill. In her research she uses biomolecules such as DNA, proteins, and intact virus particles as scaffolds for self-assembly to take advantage of the specificity and versatility they provide. These biotemplates give us access to a size scale that is difficult or impossible to reach using other techniques, particularly for assembly in three dimensions.

### 2. Scientific Activities sponsored by CSACS:

#### a. Course and Workshops

In addition to two workshops in the summer (SCAN and FTIR), Centre members and the CSACS scientists-in-residence offered CHEM 634, the CSACS course focusing on characterization techniques. 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.

#### CHEM 534/634

This year the class was combined with undergraduate students. Students registered: 23, Guests on average per class: 5

<u>Date</u>	<u>Speaker</u>	<u>Subject</u>	<u>Affiliation</u>
Jan. 8	Bruce Lennox	Self-Assembly part 1	CSACS McGill
Jan. 15	Adi Eisenberg	Diblock copolymers	CSACS McGill
Jan. 22	Pat Kambhampati	Quantum Dots part 1	CSACS McGill
Jan. 29	Pat Kambhampati	Quantum Dots part 2	CSACS McGill
Feb. 5	Bruce Lennox	Self-Assembly part 2	CSACS McGill
Feb. 12	Chris Barrett	Wet measurements	CSACS McGill
Feb. 19	Chris Barrett	Soft Lithography	CSACS McGill
March 5	Federico Rosei	SPM	CSACS INRS
March 12	Andreas Ruediger	Oxide nanomaterials	INRS
March 19	Dima Perepichka	Organic Photovoltaics	CSACS McGill
March 26	Amy Blum	Molecular Electronics	CSACS McGill



## Annual Report (2009-2010) con't.

### Workshops/Date

### Speakers/Affiliation

SCAN/Sept. 16, 2009

Antonella Badia, Maryam Tabrizian, Stephen Hussey, Greg Wills and Jaakko Välimaa/  
CSACS, CBB, Biolin Scientific

Attendance: 25

FTIR/Feb. 22, 2010

Henri Buijs/Bomem, Delta Photonics

Attendance: 15



### **b. CSACS lecture series 2009-2010**

The CSACS lecture series was again coordinated by W. Skene (U. de Montréal). There were 4 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 four speakers and the universities where they lectured are listed below:

Oct. 5/7, 2009

Prof. David Leigh , University of Edinburgh.

*Tooling Up for Nanoworld: The Magic of Molecular Machines*  
McGill /Sherbrooke

Oct. 19/20/21, 2009

Prof. Francisco Raymo , University of Miami.

*Photoswitchable Luminescent Probes for Fluorescence Nanoscopy*  
Sherbrooke/ McGill/UdeM

Nov. 3/4/5/6, 2009

Prof. Olof Ramstrom , KTH - Royal Institute of Technology

*Supramolecular Control in Synthesis and Discovery Processes*

McGill/UdeM/Sherbrooke/Concordia

May 11/12, 2010

Prof. Christopher Murray U. of Pennsylvania

*Programing multi-component nanocrystal assembly: Building with Artificial Atoms*

McGill /UdeM

For more details visit us at  
[www.csacs.mcgill.ca](http://www.csacs.mcgill.ca)

## Annual Report (2009-2010) con't.

### c. CSACS Annual Meetings

2009 Annual Meeting, McGill, May 8, 2009 (Friday)

The 2009 Annual meeting was organized by Will Skene and A. Badia at the Université de Montréal. 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, Wolfgang Meier, was invited to be the outside speaker. The other lecture showcased the accomplishments of one of our Centre members, Françoise Winnik, who develops polymer self-assemblies for pharmaceutical applications. 161 members and visitors attended and students presented 39 posters. The keynote lectures were:

Françoise Winnik, U. de M.

*How chemistry and the environment control the self-assembly of telechelic amphiphilic polymers.*

Wolfgang Meier, U. Basel.

*Polymer Membranes with Biological Functions: From Polymer nanoreactors to highly selective water filters.*

2010 Annual Meeting, Concordia, May 6, 2010 (Thursday)

This year's Annual meeting is organized by Louis Cuccia, Dima Perepichka, Rolf Schmidt and Petr Fiurasek at Concordia University. Last year in October, the CSACS coordinator went to SONS 2 final meeting, where he met a colleague, Ana Helman, from European Science Foundation, with whom a possible sponsorship was discussed. In February, Ana contacted the Education & Colloquia committee and announced that they will be sponsoring the travel for 3 speakers from SONS 2 and thus make it possible to invite 3 international speakers to have in total 5 speakers at this year's annual meeting. Rolf Schmidt made a new website for the annual meeting. The invited speakers are:

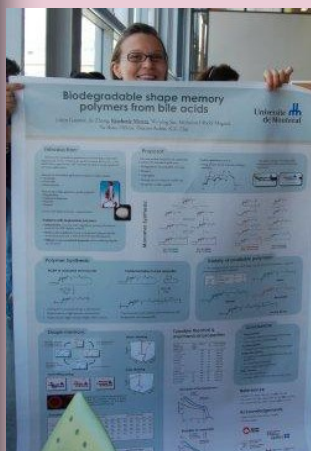
Flemming Besenbacher (Aarhus U., Denmark) *Dynamics of nanostructures: Diffusion, self-assembly, self-organization, DNA dolphins and nanoboxes.*

Klaus Kern (Max-Planck-Institut, Germany) Dr. Kern did not attend due to health issues.

Mario Ruben (Institute of Nanotechnology, Germany) *Supramolecular spintronic devices.*

Adi Eisenberg (McGill) *Novel hemispherical block copolymer morphologies from collapsed vesicles (kippah vesicles).*

GuojunLiu (Queen's) *A block copolymer approach to architectural polymers.*



## Annual Report (2009-2010) con't.

### d. CSACS Student Symposium, Sherbrooke U., Sept. 10, 2010.



The fourth CSACS Student Symposium, held at the Centre Culturel de l'Université de Sherbrooke, was attended by 60 students. Eight 20 minute talks and 15 posters were presented. The conference was organized entirely by Jean-Francois Wehrung from Zhao's group, Iryna Perepichka from Bazuin's group and the CSACS coordinator. This year the students had decided to invite a CSACS member, Federico Rosei, as an invited speaker. The 2009 speakers and the lecture titles of the 2009 symposium are listed below. The 2010 student symposium will be held at U. de M.



Mykola Kondratenko (McGill)

*Design and molecular junction study of ttf- $\sigma$ -fluorene*

Olga Borozenko (UdeM)

*Poly(acrylic acid) brushes: study of surface properties*

George Rizis (McGill)

*Chain end of the core block influences colloidal stability in poly(ethylene oxide)-block-poly(caprolactone) micelles*

Mohamed Mezour (UQAM)

*Imaging electrocatalytic activity with secm*

Oleksandr Ivasenko (McGill)

*Surface-confined supramolecular polymers*

Stephane Dufresne (UdeM)

*Conjugated azomethines for new materials*

Sabine Huebner (UQAM)

*The effect of ferrocene methanol on the intracellular glutathione and its application to scanning electrochemical microscopy*

Pierre Karam (McGill)

*Disclosing exciton migration in single water soluble conjugated polymer encapsulated in liposome nanocontainers*

Federico Rosei (INRS, conférencier invité)

*Mentorship for young scientists: developing scientific survival skills*



## Annual Report (2009-2010) con't.

### e. CSACS Mini Symposia

The format of the mini-symposia continued to rotate among the 4 research axes of the centre. In addition to the polymer self-assembly and biomimetic interfaces research axes that were held in 2008/09, the liquid crystal and self-assembled monolayers were the last two themes covered.

#### December 9, 2009 (McGill University) Liquid Crystal Research Theme

Speakers:

Linda Reven (McGill) *Nanoparticle dispersions in liquid crystal matrices.*

Geraldine Bazuin (U. of M.) *Liquid crystalline ionically complexed polymers: some facts, questions and applications.*

Stephen Hyde (Australian National University in Canberra) *Unconventional 2D and 3D foams and some conjectured liquid crystalline structures in self-assembled hydrophilic-hydrophobic-fluorophilic star polyphiles.*

#### March 31, 2010 (U. of M.) Self-assembled Monolayers Research Theme

Speakers:

Jean-François Masson (U. of M.) *Biosensors based on microsphere self-assembly and biological monolayers*

Louis Cuccia (Concordia) *Self-assembly of 4,6-di(alkylamino)-zwitterionic quinones at the liquid-solid interface - an STM investigation.*

Antonella Badia (U. of M.) *Probing Redox-Induced Molecular Reorientations in Electroactive Self-Assembled Monolayers.*

### f. CSACS Scientists-in-Residence

Stephen Hyde, Australian National University in Canberra was a visiting scientist from February to December, 2010. He was 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".

Peter J Skabara, is scheduled to arrive in June 2010. He'll be hosted by the laboratory of Dima Perepichka.



## Annual Report (2009-2010) con't.

### g. 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 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 2010 program are listed below:



- |  |        |                    |
|--|--------|--------------------|
| 1. Katherine Bujold  | McGill | Sleiman/Barrett    |
| <i>Incorporation of azobenzene in 3D DNA nanotubes</i>             |        |                    |
| 2. Antoine Beauvais-Lacasse  | McGill | Perepichka/Rosei   |
| <i>Polymer film assemblies for fluorescent solar concentrators</i> |        |                    |
| 3. Erik Margulies  | McGill | Perepichka/Andrews |
| <i>Synthesis of 2D pi-conjugated polymers</i>                      |        |                    |
| 4. Cindie Eugene   | UdeM   | Pellerin/Badia     |
| <i>Characterisation of phospholipid bilayers by AFM and FTIR</i>   |        |                    |
| 5. Janet Belliveau   | McGill | Sleiman/Cosa       |
| <i>Encapsulation of proteins in 3D DNA nanotubes</i>               |        |                    |
| 6. David Chung   | McGill | Perepichka/Blum    |
| <i>Self-assembly of anthracenes on gold surface</i>                |        |                    |

### h. CSACS Sponsored Symposia

Upcoming major meetings in Montreal that will feature CSACS sponsored symposia and other scientific events:

AFM summer school	2000\$
SONS	2000\$
RISE	500\$
Student seminar speaker	500\$

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



## Annual Report (2009-2010) con't.

### j. Stage International FQRNT

The international internships of the Fonds Nature et Technologies aim to foster the international mobility of Master's and PhD students whose research activities are part of the scientific program of a strategic cluster. Four students have received the scholarship.



Tina Lam (Gary Hanan): (9 581\$) Sept.-Dec. 2010, Paris, France. She joined the research group of Prof. Bernold Hasen-Knopf at the Université Pierre et Marie Curie, in Paris, France, to work on self-assembled magnetic materials.

Jonathan Milette (Linda Reven): (5000\$) March-April 2010, at York, UK. He works on nanoclusters-liquid crystals (LC) dispersions, which will be characterized at the advance material research group lead by Prof. John Goodby at the University of York.

Two more from Gary Hanan's group were recently awarded \$5000.00

### k. Encouraging Commercializable Outcomes (ECO) Grants

Purpose: To fund small projects, led by a CSACS principal investigator, which objective is to demonstrate or strengthen proof-of-principle for a CSACS research-based invention. Successful projects are expected to lead to results with strong commercialization potential.

Amount of funding: \$20,000 max per project (direct research costs only).

Project time frame: 1 year

Applications: Cover page + 2 pages max.

Adjudication: By members of Industrial Innovation Program Committee of CSACS

#### 2010 Winners

Will Skene U. of M., *Prototype of Electrochromic Device Derived from Azomethines* - Proof of Concept of Environmentally Friendly Materials

Michel Lafleur U. of M., *Sterosomes as skin barrier replacement*

Jean-François Masson U. of M., *Integration of peptide self assembled monolayer on microhole arrays*





Student Committee

Iryna Perepichka  
(présidente)  
Andrea Greschner,  
Université McGill  
George Rizis, Université McGill  
Gwen Bazis, Université de Montréal  
Olga Borozenko, Université de Montréal  
Pierre Karam, Université McGill  
Stéphane Dufresne, Université de Montréal  
Zahid Mahimwalla, Université McGill

**Annual Report (2009-2010) con't.****l. Translation**

On March 2010, Franck Bélanger, of Traduction CORLEO Translation, became the official translator of CSACS monthly bulletins. He translated the official website of CSACS annual meeting in French.

**m. New committees**

On the initiative of the new Director, new committees were created to facilitate the organizational structure of CSCAS. Also some members on the RAC were replaced.

Research Activities Committee (RAC), present Members:

Theo van de Ven , McGill University (Director)  
Antonella Badia , University of Montreal (Associate Director)  
Linda Reven, McGill University (Former Director)  
Jean-François Masson, University of Montreal  
Christopher Barrett, McGill University  
Yves Dory, University of Sherbrooke  
Louis Cuccia, Concordia University

Industrial Innovation Program (IIP) Committee, present Members:

Jean-François Masson, University of Montreal (Chair)  
Erica Besso, Research Innovation Officer, Faculty of Science, McGill U.  
Mark Andrews, McGill University  
Julian Zhu, University of Montreal  
Juan Schneider, Industrial collaborator, Nanometrix

Scholarship Selection Committee

Yves Dory (chair), University of Sherbrooke (Chair)  
Gonzalo Cosa, McGill University  
Christian Pellerin, University of Montreal  
Christine DeWolf, Concordia University

Education & Colloquia Committee

Louis Cuccia, Concordia University (Chair)  
Will Skene, University of Montreal  
Dmitrii Perepichka, McGill University  
Petr Fiurasek, coordinator, McGill University

## Annual Report (2009-2010) con't.

### Appendix 1

Governance of the Centre for Self-Assembled Chemical Structures (CSACS)

#### 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)

Theo van de Ven - 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)

Theo van de Ven, McGill University (Director)

Antonella Badia , University of Montreal (Associate Director)

Linda Reven, McGill University (Former Director)

Jean-François Masson, University of Montreal

Christopher Barrett, McGill University

Yves Dory, University of Sherbrooke

Louis Cuccia, Concordia University

# Annual Report (2009-2010) con't.

## Appendix 2

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

1.Name:

Centre for Self-Assembled Chemical Structures

2.Location:

Department of Chemistry, McGill University, Pulp & Paper Research Centre, Rm 111.

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.

## **Annual Report (2009-2010) con't.**

### **Appendix 2 con't.**

#### 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.

Traduction

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