How to apply…

Requirements:

- Current enrollment in an undergraduate major in Chemistry, Physics, Chemical or Material Engineering
- Good academic record (3.0/4.0 minimum GPA)
- Must select two CSACS members

Documents required:

- CSACS Summer Student application (available from: www.csacs.mcgill.ca)
- Transcript of your grades

Submit the following documents **no later than February 14, 2016** to Professor Yves Dory (Sherbrooke U.) or csacs.chemistry@mcgill.ca. The successful applicants will be contacted in the beginning of March.

CSACS/CRMAA Research:

www.csacs.mcgill.ca

See our website for information about the Professors and their research.

CSACS/CRMAA *is a research Centre based on a method of structure formation: molecular self-assembly*. Centre research focuses on polymer self-assembly (micelles, *multilayer films), supramolecular complexes, liquid crystalline materials, self-assembled monolayers and biomembranes. 40 Professors from five Quebec universities (McGill, INRS-ENT, Sherbrooke, Concordia and Montreal) along with associated graduate students, post-doctoral fellows and research associates provide a stimulating research environment as well as top notch laboratory and instrumental facilities. The purpose of the CSACS Summer Research Program is to expose undergraduate students to the broad range of skills required to synthesis and/or characterize the complex structures formed by self-assembly as well as an opportunity to participate in a collaborative research effort.*

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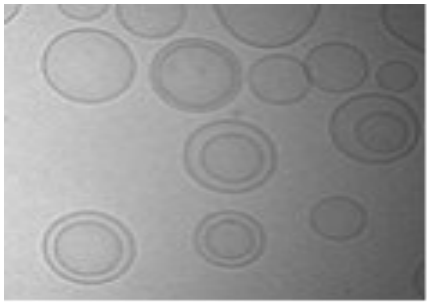
CSACS/CRMAA

Center for Self-Assembled Chemical Structures
Centre de recherche sur les matériaux auto-assemblés

2016 Undergraduate Summer Research Program

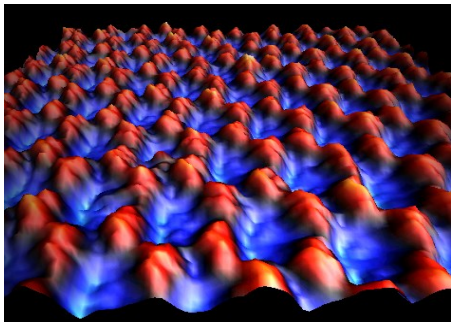
http://www.csacs.mcgill.ca

Research



Development of new light-sensitive nanovectors. *Michel Lafleur and Geraldine Bazuin, (U. Montreal)*

In early 2000's, we found that mixtures of cholesterol and fatty acids could form smectic liquid crystalline phase which can be extruded to provide unilamellar vesicles or nanovectors. The resulting self-assemblies show several interesting properties including a remarkably low passive permeability and the possibility to trigger the release by a pH stimulus. We are now looking at creating light sensitive liposomes by combining our non phospholipidic vesicles and the azobenzene chemistry. Given the photoisomerization of this functional group and the impact of this change on the stability of self-assemblies, we will examine the possibility to develop a class of high sterol-content non-phospholipid light-sensitive liposomes. The project includes the synthesis of azobenzene analogues and the characterization of the stability, structure and light sensibility of the resulting self-assemblies.



Studying self-assembled molecular nanopatterns (SAMNs) by Scanning Tunneling Microscopy. *Dima Perepichka (McGill) and Federico Rosei (INRS).*

Scanning tunneling microscopy (STM) at the solution/solid interface is a powerful tool to investigate the molecular self-assembly in two dimensions. Recent work in our labs has shown that self-assembly of trimesic acid together with a aliphatic alcohols results in linear nanopatterns on highly oriented pyrolitic graphite (HOPG) surfaces. The periodicity of these lines can be easily tuned by changing the length of the alcohol. Such Self-Assembled Molecular Networks can be used as templates for precise positioning of other functional molecules, such as C_{60} in a nanomesh structure. The student hired for this position will extend our work in these areas, studying novel hydrogen-bonding molecular building blocks under a variety of conditions, with the aim to understand the relationships and limitations of supramolecular interaction at surfaces.

Sample projects:

- Synthesis, dynamics and surface properties of heterocyclic foldamers. *Louis Cuccia(Concordia) and Garry Hannan (U. Montreal)*
- Preparation of functional and nanostructured materials using self-assembly of cyclic peptides in polymers. Yue Zhao and Yves Dory (U. Sherbrooke)
- Multifunctional dendritic architectures: design, synthesis and self-assembly. *Ashok Kakkar and Tony Whitehead (McGill)*
- *Theoretical simulations of nanoparticle - liquid crystal assemblies. Alejandro Rey and Linda Reven (McGill)*
- Designing multitask nanomaterials using self-assembly. *Ashok Kakkar and Theo van de Ven (McGill)*
- Amphiphilic polymeric aggregates as drug carriers. *Suzanne Giasson and Julian Zhu (U. Montreal)*

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