

BIOGRAPHY

Ph.D. Candidate

Christopher Samuel Jennings

Graduate Academic Unit

Chemistry

~~~~~

**November 6, 2020**

**2:30 p.m. (Atlantic)**

**Virtual Defence**

~~~~~

Examining Board:

Dr. Gobinda Saha (Mechanical Eng.)

Dr. James Tait (Chemistry)

Dr. Ghislain Deslongchamps (Chemistry)

Dr. Barry Blight (Chemistry) Supervisor

External Examiner: Dr. Michael Katz
Dept. of Chemistry
Memorial University of Newfoundland

The Oral Examination will be chaired by:

Dr. Kevin Englehart, Associate Dean of Graduate Studies

Universities attended (with dates & degrees obtained):

2017 – present	Ph.D. candidate (Chemistry), University of New Brunswick
2015 – 2016	Master of Research (Chemistry, MSc (Res)), Durham University
2012 – 2015	Bachelor of Science (Chemistry, BSc Hons.), Durham University

Publications / Awarded Grants & Scholarships:

- **C. S. Jennings**, J. S. Rossman, R. J. Marshall, R. S. Forgan and B. A. Blight, “Immobilising Giant Unilamellar Vesicles with Zirconium Metal-Organic Framework Anchors”, *manuscript submitted*.
- B. A. Blight, T. I. Ahmad, H. J. Shepherd, **C. S. Jennings**, L. I. Ferland, S. J. Teat and J. S. Rossman, “Sterol Uptake by an Alkali- β -Cyclodextrin Metal-Organic Framework”, *Cryst. Growth Des.*, **2020**, *20* (1), 43-48
- Frank J. and Norah Toole Graduate Scholarship in Chemistry - *Scholarship awarded twice* (2017 - 2018 and 2018 - 2019 academic years)
- New Brunswick Innovation Foundation: Research Assistantship Initiative - *Grant awarded*
- New Brunswick Innovation Foundation: STEM and Social Innovation Award to International Students - *Grant awarded*.

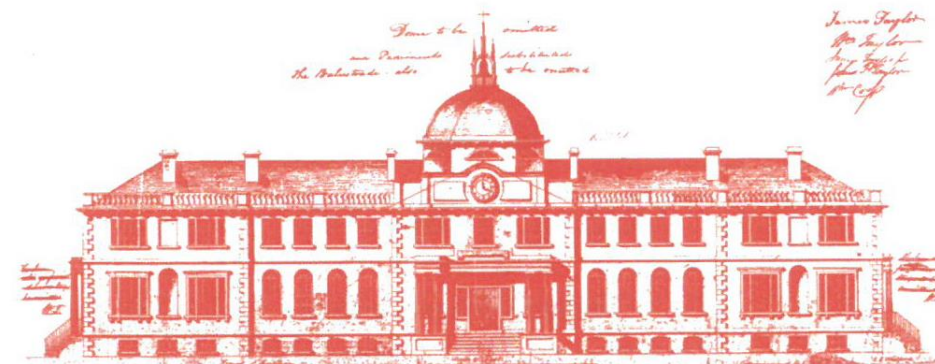
Conference / Symposium Presentations:

- RSC Macrocyclic and Supramolecular Chemistry Meeting – 16th - 17th December 2019 – *Poster Presentation*
- 102nd Canadian Chemistry Conference and Exhibition (CCCE) – 3rd - 7th June 2019 – *Poster Presentation*
- 10th Annual New Brunswick Health Research Foundation Conference – 7th - 8th November 2018 – *Poster Presentation*
- Annual Postgraduate Symposium (Durham University, Department of Chemistry) – 15th June 2016 – *Oral Presentation*
- RSC Dalton 2016 (University of Warwick) – 29th - 31st March 2016 – *Poster Presentation*.

Developing New Supramolecular Tools for Biomedical and Environmental Applications

Abstract

Supramolecular chemistry has quickly developed from simple host-guest chemistry to the self-assembly of molecular building blocks to form large aggregates, both in solution and the solid state. Currently, supramolecular structures are being developed for several applications, including gas storage technologies, heterogeneous catalysis, chemical sensors and drug delivery systems. Among these structures are metal-organic frameworks (MOFs), metal-organic polyhedra (MOPs) and vesicles. Here, we assess the ability of MOFs to remove cholesterol from the bloodstream. A diverse series of MOFs were first selected from the literature and then synthesised, characterised and their ability to uptake cholesterol quantified by liquid phase ^1H NMR analysis. Further work was undertaken where different methodologies to encapsulate MOF particles within a vesicle - a lipid bilayer cell model - were explored. This process is designed to improve the biostability and bioavailability of the MOF candidates in their role as cholesterol-removal agents. This study led to the serendipitous finding that micron-sized MOF particles can be used to immobilise vesicles, which may provide an alternative strategy to the study of their biophysical and mechanical properties. Finally, two novel, fluorine-rich MOPs have been designed for the selective uptake of chlorofluorocarbons (CFCs), and for eventual use within the environmental chemistry domain. The molecular building blocks that comprise these MOPs have been synthesised and characterised, and the final steps of MOP synthesis and characterisation are currently ongoing.



Home of the School of Graduate Studies, Sir Howard Douglas Hall was designed by J.E. Woolford in 1825 and is the oldest university building in Canada still in use.

The University of New Brunswick recognizes that the university sits on traditional Wolastoqey territory. The river that runs right by our university – the St. John River – is also known as Wolastoq, along which live the Wolastoqiyik -- the people of the beautiful and bountiful river.

UNIVERSITY OF NEW BRUNSWICK SCHOOL OF GRADUATE STUDIES

ORAL EXAMINATION

Christopher Jennings

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY