

History of the Department of Chemistry

McGill University

1965-2019

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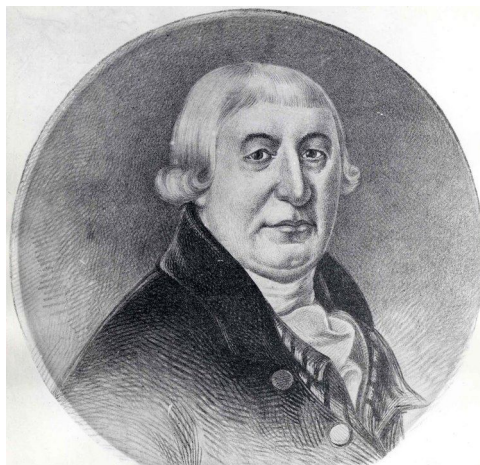
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History of the Department of Chemistry, 1965-2019

1.1 Introduction

The history of McGill University has already been well-documented since its founding in 1821 from a bequest of James McGill, a well-known Scottish merchant. About 150 years later, in 1974, the Board of Governors agreed to set up the History of McGill Project under the directorship of the former Vice-Principal (Administration and Professional Faculties) Stanley Frost. He produced a two-volume treatise in 1980 and 1984 that covered McGill's history for the periods 1801-1895 and 1895-1971, respectively.^{1,2} Frost went on to write several other accounts of McGill's history, including a book about James McGill himself³ and a charming short story about Principal Sir John William Dawson's arrival with his family in 1885.⁴ As we are about to enter upon McGill University's bicentennial year in 2021, we felt that it would be appropriate to present an account of the recent history of one of the oldest departments in the university as part of the 2021 celebrations.

The Department of Chemistry has been in existence for well over 150 years, initially as part of the Department of Medicine, when it was known as Pharmaceutical Chemistry. It actually became an independent department in 1908. Both Leo Yaffe, who was Chair from 1965-72, and Tony Whitehead have written fascinating accounts about the early history of McGill and the Department. These accounts were the basis of their talks to the James McGill Historical Society in 1978⁵ and 1994,⁶ respectively. An extended extract from Leo Yaffe's account is given in Appendix A. The present article will focus chiefly on some of the overall highlights of the Department's record from around 1965 until the present time.



James McGill

Leon St-Pierre was recruited in 1965 from the General Electric Corp. in Schenectady, New York by the Department Chair, Clifford Purves, to set up Polymer McGill. Sadly, Purves passed away in that same year and Leo Yaffe, a renowned nuclear and radiochemist, was recalled from his leave-of-absence position as Director of Research of the International Atomic Energy Agency in Vienna to become the new Chair. In taking up his appointment, Yaffe managed to convince the University administration that there was an urgent need to dramatically increase the number of academic staff in the Department in order to stay competitive with other universities across the country. These proposed new appointments also coincided with the major move of the Department in 1966 from the MacDonald Chemistry and Mining Building on campus to the new, spacious Otto Maass Chemistry Building located at the corner of Sherbrooke St. West and University Street.⁷ In 1974, Leo Yaffe was appointed Vice-Principal (Administration) of McGill, a post he held until his retirement in 1981. He also served as President (1981-82) of the Chemical Institute of Canada. His later scientific interests included the use of nuclear methods to determine the age and place of origin of archaeological artifacts. Working with a visiting professor from Turkey and McGill Professors of Classics and Archaeology, Yaffe and his graduate students were able to establish theories about early trade routes in Turkey, Greece, the Caribbean, and those of the Iroquois in the Ottawa Valley. Room 217 in the Otto Maass Building is named after Leo Yaffe, as is the old billiard room in the Faculty Club.

In 1965, Leo Yaffe succeeded in hiring three Assistant Professors, Denis Gilson and Arthur Grosser (Physical Chemistry) and James Fresco (Analytical Chemistry). The next year, he hired four more Assistant Professors, Tak Hang (Bill) Chan and David Harpp (Organic Chemistry), Ian Butler (Inorgan-

ic/Physical Chemistry), John Harrod (Inorganic and Organometallic Chemistry) together with an Associate Professor, Donald Patterson (Polymer Chemistry). These appointments were quickly followed by the hiring of seven more Assistant Professors, Byung C. Eu (Theoretical Chemistry), Patrick Farrell (Physical-Organic Chemistry), Eric Salin (Analytical Chemistry), William Galley (Biophysical Chemistry) and James Hogan (Nuclear Chemistry and three Professors, Arthur Perlin (Cellulose Chemistry), Adi Eisenberg (Polymer Chemistry) and Bernard Belleau (Organic Chemistry). All of these new professors rapidly started on furthering their research careers. At the same time as these new appointments place, there were a number of retirements, including Helen Reynolds, Archie Ross, and Robert (Bob) Nicholls in 1970. In addition to teaching General Chemistry to nurses, Helen Reynolds was the Warden of The Royal Victoria College at McGill from 1962-70.

Annie Louise MacLeod, who was the first woman to ever receive a Ph.D. degree in the McGill Department of Chemistry, died in Florida in 1971. She obtained her Ph.D. degree in 1910, while doing most of her research at Bryn Mawr College. She went on to several teaching positions at different colleges in the USA, including Barnard, Bryn Mawr and Vassar, before finally becoming Dean of the College of Home Economics at Syracuse University.⁸ She held this academic position for 20 years until her retirement in 1948. According to an analysis by John T. (Jack) Edward in an article written for Chemistry in Canada in 1980, the number of Ph.D. degrees from the Department of Chemistry began to increase steadily from 25 in 1925 to around 800 in 1972.⁹ Edward's article was written in anticipation of the Department's 1000th Ph.D. degree that would occur in 1984. Currently, the number of Ph.D. degrees in Chemistry stands at almost 1700 and with all the new faculty members hired after the year 2000 and the larger enrolment in the graduate school, this number will continue to increase dramatically. Jack Edward also wrote an insightful history of the Department that covered the period from 1950-1980.^{10,11} He himself was particularly well-known to organic chemists throughout the world for the so-called anomeric or Edward-Lemieux effect, which is the tendency of heteroatomic substituents adjacent to a heteroatom within a cyclohexane ring to prefer an axial orientation instead of the less hindered equatorial one. Edward originally observed this effect in pyranose rings in 1955 when he was working on carbohydrate chemistry.¹² He passed away in 1999 and there is a seminar room named in his memory on the 4th floor of the Otto Maass Building (Room 428).

1.2 Expansion of the Department Faculty

So, where do we really begin with this history project? In the late 1960s and early 1970s, the undergraduate enrolment at McGill had increased enormously, in part because of the introduction of CEGEP courses on campus from 1969-74.¹³ In order to handle the large enrolments in the first-year General Chemistry courses, the lectures were televised and broadcast to the students who sat in individual carrels in the McLennan library. Arthur Grosser, who was also a talented actor,¹⁴ was particularly good at giving these lectures. This was also the time of other educational experiments. David Harpp introduced lap-dissolve slide projection in his organic chemistry lectures in 1969.^{15,16} This novel technique permitted animation, motion and time-lapse effects in the classroom. Overall, this technique anticipated PowerPoint by 25 years. Around the same time, Ian Butler developed a modular (self-study) course in inorganic chemistry.¹⁷ And Denis Gilson and Ian Butler also gave long-distance courses to the research employees of Alcan Industries in Arvida in Northern Quebec from a downtown Montreal office in Place Ville Marie (a distance of over 500 km) using a novel telephone/overhead projector system developed by Bell Telephone.¹⁸

The strong research activities in the Department during the 1970s led to the rapid promotion of the newcomers to the higher professorial ranks. Leon St. Pierre took over from Leo Yaffe to become Chair for 4 years, followed by John Harrod (1976-79) and Mario Onyszchuk (1979-1984). The complete list of Department Chairs from 1965 up until the present time is given in Appendix B. Over 20 additional professors were hired during the period 1975-2000.

During this period, two Research Associates in the Pulp and Paper Research Institute of Canada were converted to industrial professorial positions: Theo van de Ven (Physical Chemistry) and Derek Gray (Polymer Physical Chemistry). Next, both Ariel Fenster and Joe Schwarcz (Science Education) were absorbed into the Department as Adjunct Professors. There were also some retirements during this period: the renowned Pulp and Paper chemist, Stanley Mason, who supervised over 60 Ph.D. students during his distinguished career, retired in 1985. Don Patterson retired somewhat later, in 1993; among his most notable achievements was a modification of the Prigogine-Flory theory that led to a deeper understanding of polymer-solvent miscibility. The overall academic staff had now risen from the relatively small number of 10 back in the early 1960s to 37 at the present time, making the Department almost as large as those at the Universities of Toronto and British Columbia. The number

of research publications also started to mount up fast, it had moved from 55 per year in 1965 up to 159 in 1984 (vide supra). In addition, many national and international awards based upon these research efforts were received by faculty members and their research students.

Year	Professor	Research Area
1976	William Purdy	Analytical Chemistry
1976	Bryan Sanctuary	Theoretical Chemistry
1978	Kelvin Ogilvie	Organic Chemistry
1979	Eric Salin	Analytical Chemistry
1986	Jik Chin	Physical-Organic/Bioorganic Chemistry
1987	Robert Marchessault	Cellulose Chemistry
1987	Allan Hay	Polymer Chemistry
1987	Joan Power	Analytical Chemistry
1987	Bruce Lennox	Interfacial Chemistry, Bioorganic Chemistry
1988	Romas Kazlauskas	Bio-Organic Chemistry
1998	David Ronis	Theoretical Chemistry
1990	Mark Andrews	Inorganic and Polymer Materials Chemistry/Spectroscopy
1992	Masad Damha	Bio-Organic Chemistry
1992	Linda Reven	Physical Chemistry
1992	David Burns	Analytical and Biophysical Chemistry
1993	Ashok Kakkar	Organometallic Chemistry and New Materials
1995	Bruce Arndtsen	Organometallic and Inorganic Chemistry
1996	James Gleason	Organic Chemistry
1998	Parisa Ariya	Atmospheric Chemistry
1999	Hanadi Sleiman	Organic Chemistry
2000	Christopher Barrett	Physical Chemistry

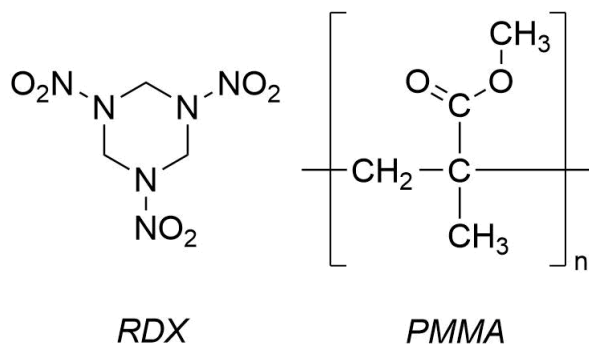
1.3 Teaching

The excellent teaching by many members of the Department was also honored through several internal prizes, including the Leo Yaffe Award (9)¹⁹ and the Principal's Prizes for Excellence in Undergraduate

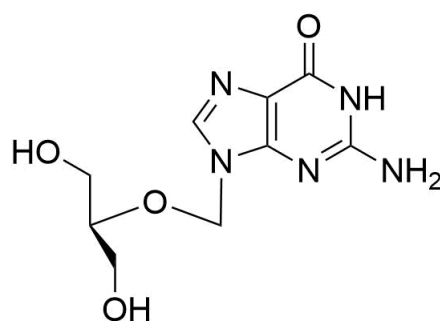
Teaching (4),²⁰ and the David Thomson Award for Excellence in Graduate Supervision and Teaching (3).²¹ There have been many memorable teachers over the years. For example, George Just taught Organic Chemistry and Natural Products Chemistry for over 50 years before his passing in 2008 at the age of 79 years, while still working full-time in the laboratory. He was especially famous with the undergraduate students because he never used notes in his lectures but filled blackboard after blackboard with detailed organic structures. Jim Hogan was another outstanding General Chemistry and Nuclear Chemistry teacher. He was also well-known for his work together with David Harpp on designing a computer program to detect cheating on multiple-choice examinations.²² McGill is the only university in the world that has such an inclusive set of Senate-established rules for this form of examination, basically successfully eliminating this type of cheating. Finally, as with many others in the Department who have retired and perhaps passed away, there are now numerous academic prizes for our students named after them.²³

1.4 Research Activities

Among the Department's earliest research milestones are, of course, Ernest Rutherford's and Frederick Soddy's Nobel Prizes in Chemistry in 1908²⁴ and 1921,²⁵ respectively, for their pioneering work in radioactivity. A few years later, in 1930, William Chalmers, who was a Ph.D. student under the supervision of George Whitby, invented a new synthesis of poly(methylmethacrylate), which was later commercialized by ICI in the UK as "Perspex" (now known as "Plexiglass").²⁶ Later, during World War II, chemists at McGill, including Robert Nicholls and his graduate student George Smart, worked extensively on the explosive RDX (cyclotrimethylenetrinitramine).²⁷ In addition, Jack Edward did his Ph.D. thesis under the supervision of Raymond Boyer in 1942 on the preparation of RDX.²⁸



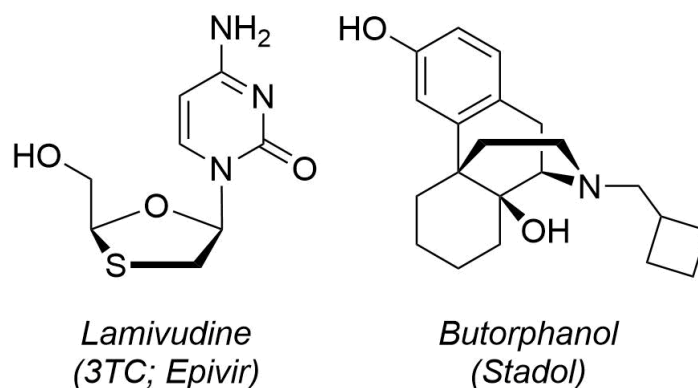
Moving on to more modern times, Kelvin Ogilvie and his colleagues, Robert Bender and Peter Duck, developed the first automated “gene machine” in 1981.²⁹ This feat of chemistry and engineering reduced the time required to manufacture a 12-unit fragment of DNA from several weeks to mere hours, which enabled the rapid expansion of the biotechnology industry. Another important discovery by Ogilvie was ganciclovir (BIOLF-62), an antiviral medication used to treat cytomegalovirus infections. In 1987, Ogilvie and his students developed a method for synthesizing RNA strands, which remains the most popular among research laboratories and industries worldwide.



Ganciclovir
(Cytovene)

An extremely vital discovery in Bernard Belleau’s laboratory in the mid-1980’s was the synthesis of 3TC (2’,3’-dideoxy-3’-thiacytidine), also known as *lamivudine*. The 3TC drug allowed the first effective combination therapy to combat HIV saving millions of HIV-infected patients’ lives and is still being used to this day. 3TC is also used to treat chronic hepatitis B. Unfortunately, Bernard Belleau died in 1989 and never saw the immense success of his drug nor Biochem Pharma, the pharmaceutical company that he co-founded with two colleagues, Francesco Bellini and Gervais Dionne.³⁰ Another important discovery by Belleau was the development of the non-narcotic analgesic *butorphanol*, which is more potent than morphine with minimal side effects so that it can be used to help persons suffering from heroin withdrawal.

In 1987, Allan Hay (Synthesis of New Monomers and Polymers) and Robert Marchessault (Polymer Materials for Imaging Applications) joined the Department as NSERC Industrial Research Professors. Both Hay and Marchessault came directly from industry: General Electric Corp. and Xerox Corp., respectively. In 1992, the Department indirectly picked up another Nobel Prize in Chemistry thanks to the work of Rudolph A. Marcus, who was a Ph.D. student in 1946 in Carl Winkler’s laboratory at McGill



and is now a professor at Caltech. This prize was awarded because of Marcus' contributions to the theory of electron transfer reactions in chemical systems.³¹ The Undergraduate Integrated Chemistry Laboratory (Room 121) is named in his honour. It should also be mentioned here that in recognition of David Harpp's many contributions to the Department, there is an undergraduate Organic Chemistry laboratory now associated with his name.

1.5 Public Outreach

The team of Ariel Fenster, David Harpp and Joe Schwarcz established what is now called The Office of Science and Society in the late 1990s. This office continues to inform the general public about everyday science problems and their solutions through bilingual newspaper articles, lectures and TV appearances.³² This dynamic trio of outstanding teachers was also successful in launching McGill's first "massive open online course" (MOOC) in 2014 entitled "Food for Thought" with over 35,000 participants and a further 20,000 over the next four years.³³ Earlier, this group had gained significant public recognition during the 1980-90s emanating from their presentations in 1978-80 at the UNESCO Science Project in the Old Port of Montreal. Over 80,000 people participated in this project. A later public project, called ExpoTec 95, in the Old Port drew over 35,000 attendees during the summer of 1995 to watch chemistry demonstrations. The Harpp-Fenster-Schwarcz team also delivered numerous public evening lectures over the period 1981-2003. On the basis of these lectures, eventually four "World of Chemistry" courses were developed at McGill during the period 1982-present for credit encompassing Food, Drugs, Technology and the Environment. To date, 41,521 students have participated in these courses. The group's latest adventure, over the past two years, has involved converting the

Food course into a Massive Open On-line Course (MOOC) with over 1600 participants, probably the largest enrolment in any course at McGill. It should also be mentioned that the group, together with two talented undergraduate students, succeeded in developing in 2000 a highly professional method of recording lectures in the classroom (or in the office or home) keeping images and sound in synchrony. The ownership of the system now resides with the programmers and McGill uses this technology (COOL, COursesOnLine) in over 70 lecture rooms to deliver automatic class recordings. At present, over 18,000 hours of lectures are being recorded annually. In 2013, the Tomlinson Chair for Science Teaching was established, with David Harpp being the current incumbent. This funding for this chair has made it possible to establish the Tomlinson Engagement Award for Mentoring (TEAM) program. Top undergraduate students in Faculties of Science and Engineering are professor-selected to mentor the next generation of students in the same course in which they excelled. To date, 2261 students have participated as mentors in about 150 courses, chiefly in Science and Engineering.

A more recent public outreach venture for the department is The Chemistry Outreach Group, which started as a graduate student initiative.³⁴ This group works to foster a better understanding of chemistry through experiments for students of all ages. Finally, several faculty members have been active over the years in the l'Ordre de Chimistes du Quebec,³⁵ the official body governing employment industrial chemistry positions in the Province of Quebec, e.g., Jack Edward, George Just, Ian Butler, Ariel Fenster and Bill Galley have all served on this committee.

1.6 Textbook Writing

A number of the members of the Department have written books. An early example is T. Sterry Hunt, who published a book in 1882 about Celestial Chemistry,³⁶ an important topic, especially in today's world. Edgar Steacie wrote about Atomic and Free Radicals in 1946.³⁷ Later, the organic professor Alfred Taurins published two books relating to the History of Chemistry.^{38,39} Leo Yaffe wrote a treatise on Nuclear Chemistry in 1968.⁴⁰ Shortly afterwards, in 1970, Ian Butler and Arthur Grosser wrote an illustrated problems book for General Chemistry, *Relevant Problems for Chemical Principles*, that eventually went into six editions, selling over 150,000 copies.⁴¹ David Harpp and Bill Chan co-authored a problems book for organic chemistry about the same time,⁴² and the two inorganic chemists, Ian Butler and John Harrod, produced a major textbook on Inorganic Chemistry in 1989.⁴³ In addition, Ian Butler

co-authored a book on the chemistry of the rare-earth element erbium in 2010.⁴⁴ In 1997, Chao-Jun Li and Bill Chan published what is considered to be one of the first books on Green Chemistry.⁴⁵ One of the most prolific book writers in the Department is undoubtedly the theoretician, Byung C. Eu, who published many fundamental books on kinetic theory and thermodynamics.^{46–51} For his efforts, Eu was elected to the Korean Academy of Science and Technology.

Another prolific book writer in the Department is Joe Schwarcz, who has published almost 20 books on interpreting science for the public.⁵² These books are often based on material drawn from his weekly column “The Right Chemistry” in the Montreal Gazette and the radio show that he hosts on Montreal’s CJAD station known as the “Dr. Joe Show”. Schwarcz, the Office for Science and Society and others are also responsible for setting up the annual Trottier Public Science Symposium that has been held now for ten years at the university.⁵³ This event was made possible by a generous donation from the Lorne Trottier Family Foundation and is a forum for students, professors, government and industry professionals to connect with the general public on advancements for sustainability through engineering and design. The associated Trottier Institute for Sustainability and Design (TISED) is a research centre based in the Faculty of Engineering at McGill; its funding includes an endowed chair, a scholars-in-residence program, and administrative support for teaching and research projects, as well as the annual symposium. A typical example of the theme for this symposium is “Minding the Future: Living in a High-tech World” (2018).

1.7 Administration Activities

Several faculty members have been active in the administration of the university over the years as members of Senate, the Board of Governors, MAUT, the Faculty Club and as Vice-Principals, Associate Vice-Principals, Deans, Associate Deans, Grand Marshalls of Convocations, Chief Examiner, etc. Carl Winkler, who was a former Rhodes Scholar, was appointed in 1966 as Vice-Principal (Planning and Development), a position he held until 1969. It should be emphasized here that Winkler was an outstanding researcher with interests in chemical kinetics and electrochemistry, as well as the reactions of active nitrogen. Among his remarkable graduate students were B. Seymour Rabinovitch (University of Washington), Rudy Marcus (Caltech) and Jack Halpern (University of Chicago).

Bill Chan was Dean of the Faculty of Science prior to becoming Vice-Principal (Academic). Alan

Shaver moved through the ranks to become Dean of the Faculty of Science, and then Provost and Vice-Principal (Academic) at Dalhousie University in Halifax, before finally ending his career as President of Thompson Rivers University in British Columbia. Following his departure from McGill, Kelvin Ogilvie eventually became President of Acadia University in Nova Scotia and, subsequently, a Senator in Ottawa. Both Ian Butler and Masad Damha served terms as Associate Vice-Principal (Research) in the Faculty of Graduate Studies and Research at McGill. David Burns, after becoming the first Associate Dean (Research) in the Faculty of Science moved on to become Vice-Principal (Research) at the University of New Brunswick. Denis Gilson was Associate Dean (Research) in the Faculty of Graduate Studies and Research and he also served for many years on the selection committee for McGill's Rhodes Scholars. Finally, with respect to the Faculty Club, following Leo Yaffe's lead (1961-62), David Harpp served as President for nine years (2008-17) and made many significant changes to the Club that have greatly enhanced its visibility. Most notably, he led the conversion of the Leo Yaffe Billiard Room into another dining/meeting room and the basement area, originally known as Ole's Bar in the 1960s, into the new McTavish Lounge. Ian Butler followed David Harpp as President for 2017-19 and negotiated the enrollment of members from the now defunct University Club, increasing the Faculty Club membership to around 1000.

1.7.1 Chairs of the Department since 1965

Professor	Tenure as Chair
Clifford Purves	1965
Leo Yaffe	1965-1972
Leon St. Pierre	1972-1976
John F. Harrod	1976-1979
Mario Onyszchuk	1979-1984
T. H. (Bill) Chan	1984-1989
Alan G. Shaver	1989-1994
Ian S. Butler	1994-1998
David N. Harpp	1998-2001
R. Bruce Lennox	2001-2013

Professor	Tenure as Chair
Masad Damha	2013-2018
Dymtro Perepichka	2018-present

1.8 Retirements and Recruitment of New Faculty Members

During the period 2000-present, there was a flurry of professorial retirements and a host of new appointments. Among the retirees was Robert (Bob) Marchessault, an early champion of biodegradable commodity plastics and the bacterial plastics known as “bioplastics”. He retired in 2005 and passed away in 2015 on his 87th birthday.⁵⁴ The polymer scientist Ron Brown moved from McGill to the new University of Northern British Columbia as Chair of the Chemistry Department, and subsequently became Dean of the Faculty of Mathematics and Science at Brock University. Unfortunately, he passed away in 2001 at too young an age. Another faculty member who died early in life, in 1997, was the laser spectroscopist, David Simkin. The renowned polymer chemist Allan Hay passed away in 2017.⁵⁵ He had an international reputation as one of the most creative and productive polymer synthesis chemists of all time and made landmark discoveries in reactions leading to polymers/plastics that have had an enormous impact on commercial products over the past 50 years. He was one of the few Canadian scientists who became a Fellow of the Royal Society in the UK.

On a much more positive note, the names of the 29 new appointees are included in the list below. With such a vast coterie of brilliant scientists, the Department is set to continue its earlier proud traditions.

Year	Professor	Research Area
1975	Alan Shaver	Inorganic and Organometallic Chemistry
2001	Paul Wiseman	Physical Chemistry
2002	Karine Auclair	Organic Chemistry
2002	Scott Bohle	Inorganic Chemistry
2003	Chao-Jun Li	Green Chemistry
2003	Nicolas Moitessier	Organic Chemistry
2003	Patanjali Kambhampati	Physical Chemistry

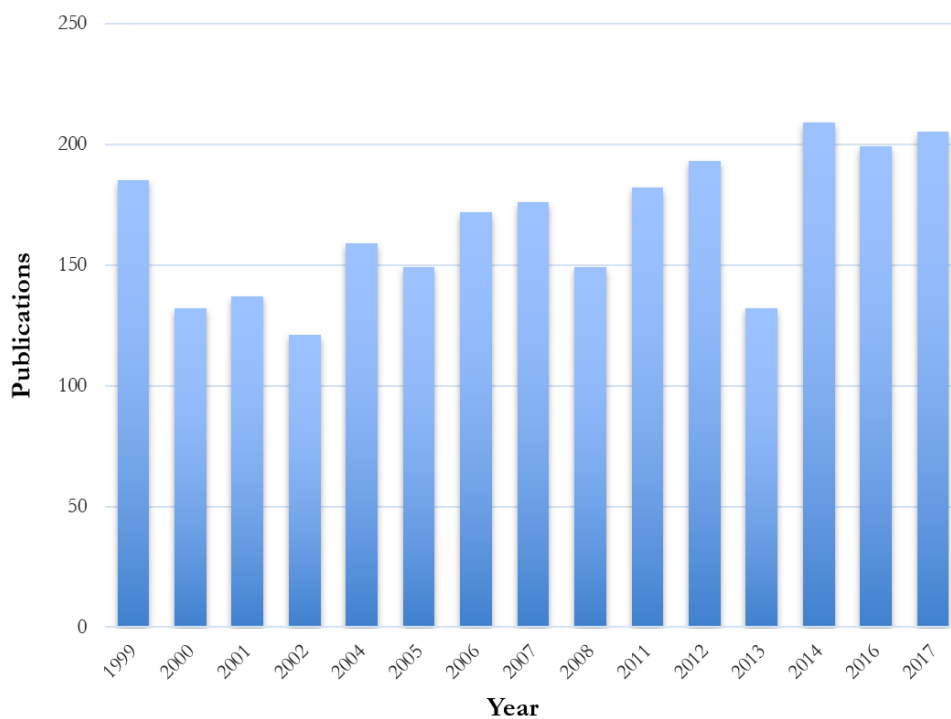
Year	Professor	Research Area
2005	Gonzalo Cosa	Physical Chemistry
2005	Anthony Mittermaier	Physical Chemistry
2005	Dmytro Perepichka	Physical Chemistry
2006	Marcus Lindstrom	Green Chemistry
2006	Bradley Siwick	Physical Chemistry
2007	Audrey Moores	Green Chemistry
2008	Amy Blum	Physical Chemistry
2009	Youla Tsantrizos	Organic Chemistry
2010	Samuel Sewall	Faculty Lecturer
2011	Tomislav Friscic	Mechanochemistry and Green Chemistry
2011	Jean-Philip Lumb	Organic Chemistry
2012	Janine Mauzeroll	Electrochemistry
2012	Laura Pavelka	Faculty Lecturer
2014	Thomas Preston	Atmospheric Chemistry
2015	Robin Rogers	Green Chemistry
2015	Rustam Khaliullin	Theoretical Chemistry
2016	Christopher Thibodeaux	Chemical Biology
2017	Matthew Harrington	Materials Chemistry
2018	Maureen McKeague	Organic and Pharmaceutical Chemistry
2018	Eric McCalla	Physical Chemistry
2018	Pallavi Sirjoosingh	Faculty Lecturer
2019	Nathan Luedtke	Bioorganic and Medicinal Chemistry
2019	Lena Simine	Theoretical Chemistry

1.9 Changes in Research Areas

In the early 2000s, the Department decided to move away from the historical subsections of Analytical, Inorganic, Organic and Physical Chemistry and transition to five broad research themes whereby graduate students and professors could be associated with more than one theme. These themes are Analytical/Environmental, Chemical Biology, Chemical Physics, Materials Chemistry, and Synthesis/-

Catalysis. In 2018, the research theme of Green and Sustainable Chemistry was added. The courses that a graduate student takes are dictated by which theme they have chosen. It is now quite common to have students working in the same laboratory who are in different research themes. It was also in the late 1990s and early 2000s when the Canada Foundation for Innovation (CFI) grants were introduced – initially for major research collaborative initiatives but presently also for special research chairs and individual grants. This funding has resulted in the Department securing major pieces of equipment, e.g., 800-MHz NMR, scanning electron microscopes (SEMs), atomic force microscopes (AFMs), electron spin resonance (EPR) and Raman spectrometers. This funding has been especially important as the equipment grants from the national NSERC funding agency are highly competitive.

The research output from the faculty members has been quite consistent over the years with there being almost 200 publications per year, as indicated in the graph below for the period 1999-2017.



Annual research output of Chemistry Department faculty members during the period 1999-2017.

1.10 Technology Transfer

Another major change over the years has been the commercialization of university research through the Office of Technology Transfer. Several members of the Chemistry Department have successfully founded spin-off companies, including Mark Andrews (Lumenon Innovative Technology, Plastic Knowledge, Anomera), David Burns (Molecular Biometrics), Tomislav Friscic (Acsynam), Masad Damha (Anagenis, Inc.) and Audrey Moores (ChitoDry). Nicolas Moitessier co-founded Molecular Forecaster in 2010 together with Dr. Eric Therrien. In 2018, Dr. Joshua Pottel took over as the full-time CEO of this company, which has an exclusive agreement with McGill University for the distribution and use of the Forecaster and Virtual Chemist platforms. Together, these two software platforms allow the formation of the ultimate virtual chemistry laboratory with a docking program, a metabolism prediction protocol, and an asymmetric catalysis simulation algorithm.

1.11 Awards and Kudos

Many faculty members are continuing to be honored with national and international awards for their research efforts. Of particular note are the Killam Prizes to Bill Chan (Organic Synthesis in Water), John Harrod (Organosilicon Chemistry), Hanadi Sleiman (DNA Interactions) and C. J. Li. (Green Chemistry), and the Steacie Prizes to Kelvin Ogilvie (Bioorganic Chemistry) and Tomislav Friscic (Mechanochemistry). Many faculty members are Fellows of the Royal Society of Chemistry (UK), the Royal Society of Canada and the Canadian Institute of Chemistry. Allan Hay was a Fellow of the Royal Society in the UK. Mark Andrews deserves a special mention as he is also a talented artist. His art work has been recognized by him being appointed as Artist in Residence in Parrsboro, Nova Scotia for two weeks during the summer of 2019. He is hoping to have a one-man show in the near future.

Many of our graduates have gone on to outstanding careers in academia, industry and government. For example, both Peter Morand (a Ph.D. student of Jack Edward) and Suzanne Fortier went on to become Presidents of NSERC in 1990-95 and 2006-13, respectively; moreover, Suzanne Fortier is currently Principal and Vice-Chancellor of McGill University. John Larkindale, a Ph.D. student supervised by the late David Simkin, became the High Commissioner (equivalent to Ambassador) for New Zealand to Russia and Australia.⁵⁶ Mona Nemer, a Ph.D. student from Kelvin Ogilvie's group,

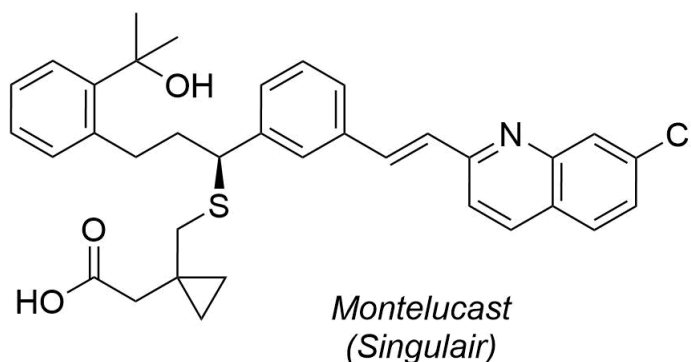
has recently been appointed Chief Science Advisor to Canada's Prime Minister (Justin Trudeau), Minister of Science and Cabinet, a position in which she provides advice on issues related to science and government policies.⁵⁷

Numerous graduate, postdoctoral, and visiting students have gone on to successful academic careers in Canada and elsewhere throughout the world, including Arndtsen's group: David Leitch (Univ. of Victoria), Laure Kayser (Univ. of Delaware), Zhiyong Han (Univ. of Science and Technology, China), Rania Dghaym (Zayed Univ., United Arab Emirates), Ali Siamaki (Fayetteville Univ.); Auclair's group: Caputo (Univ. of New Hampshire); Butler's group: Ann English (Concordia Univ.), Yining Huang (Western Univ.), Pierre Harvey (Université de Sherbrooke), Ashraf Ismail (McGill Univ.), Andrew Vreugdenhil (Trent Univ.), Mihai Scarlete (Bishop's Univ.), Ione Baibich (Univ. of Rio Grande do Sul, Porto Alegre, Brazil), Neil Coville (Witwatersrand Univ., South Africa), Frank Smith (Laurentian Univ. and Cornell Medical School, Doha campus, Qatar), C. Frank Shaw III (Southern Illinois Univ.), John Grey (Univ. of New Mexico) and Morgan Thomas (Sophia University, Japan), Shadia Elsayed (Damietta Univ., Egypt), Hala Elasmay (Mansoura Univ., Egypt), Ahmed Shabana (Mansoura Univ., Egypt), Daniela Bianchini (Univ. of Pelotas, Brazil), Zia ur-Rehman, Quaid-i-Azam Univ., Pakistan), Hizbullah Khan, Univ. of Bannu, Pakistan), Archana Tiwari (Sikkim Univ., India), Zhenhua Xu (Peking Univ., China), Sayyed Tayyari (Ferdowsi Univ., Iran), Brij Tewari (Univ. of Guyana); Damha's group: Rob Hudson (Western Univ.); Chris Wilds (Concordia Univ.), David Sabatino (Seth Univ.), Jonathan Watts and Matthew Hassler (U. Mass Medical School); Fresco's group: Olavi Siiman (Clarkson Univ.); Harpp's group: Ron Priefer (Univ. of Western Massachusetts), Kosta Steliou (Boston Univ.), Thomas Back (Univ. of Calgary), Marc Gingras (Aix-Marseille Univ., France), Imad Abu-Yousef (American Univ. of Sharjah), Eli Zysman-Colman (St. Andrews Univ., Scotland); Just's group: Paris Georghiou Memorial Univ. of Newfoundland) and Edward Lee-Ruff, Clifford Leznoff and Pierre Potvin (York Univ.); Lennox's group: Louis Cuccia (Concordia Univ.); Lumb's group: Wenbo Xu (Shandong Univ., China); Moores' group: Annie Castonguay (Institut Armand Frappier), Julien Haines (Institut Charles Gerhardt Montpellier, France), Reuben Hudson (College of the Atlantic), Kylie Luska (McMaster Univ.), Shingo Ishakawa (Tokyo Medical University); Simkin's group: Clarence Gall (Univ. of Zulia, Venezuela). Sleiman's group: Hassan Bazzi (Texas A & M Univ., Doha campus, Qatar);

There are also many examples of McGill Chemistry undergraduates who have completed their

Ph.D. degrees elsewhere and who are now in academic positions including Emily Cranston (Univ. of British Columbia), Chris Orvig (Univ. of British Columbia), Delphine Farmer (Colorado State Univ.), Joyce Hung (Auburn Univ.), Vanessa Huxter (Univ. of Arizona), Janet Macdonald (Vanderbilt Univ.), Lindsey McQuade (Univ. of Illinois), Ozzy Mermut (York Univ.), Vickie Meli (Mount Allison University), Jennifer Murphy (University of Toronto), Kalaichelvi Saravanamuttu (McMaster Univ.), Cameron Skinner (Concordia Univ.) and Simon Trudel (Univ. of Calgary).

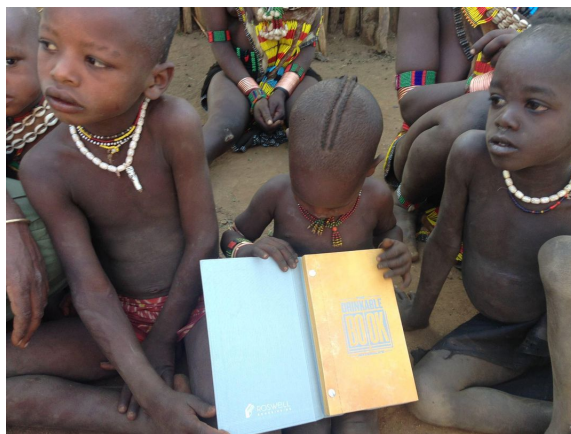
In industrial settings, Robert Zamboni (Just) is renowned for the development of the drug Singulair for the treatment of asthma while he was a research scientist at Merck.



Ralph Paroli (Butler) is Director of Research and Development at NRC Metrology, the unit in Canada that is currently setting the standards for marijuana use throughout the country following its legalization in 2019. Monika Rak (Moores) is a co-founder of the carboxylated cellulose nanocrystal company Anomera based in Montreal. A co-supervised student from the Butler/Bohle groups, Joël Poisson, was the Director of Emergency Response in Transport Canada that is responsible for handling major emergencies, such as the Lac-Mégantic rail disaster in 2013 and the Fort McMurray wildfire in 2016. Aaron Larsen (Auclair) is now a senior scientist with Moderna Therapeutics. Richard Hart (Whitehead) founded American Diagnostics in 1982 and recently has been a generous donor to McGill University for fellowships in the Faculty of Science. Five of Damha's students have gone on to successful careers in industry - Rami Hannoush (*Genentech*), Paul Peng (*Alnylam*), Jeremy Lackey and Maryam Habibian (*Twist Bioscience*) and Maryam Yahyaei (*Dicerna*). Yacoub Fall (Lumb) is working as a research scientist at OmegaChem, while Elizabeth Li (Lumb) is at IC Axon in Montreal. Olavi Siiman (Fresco) moved from teaching at Clarkson University to become Principal Research Scientist at Beckman-Coulter Life Sciences in Florida.

1.12 Research Discoveries

There have been many other exciting discoveries by the faculty members in the Department over the past 55 years. For instance, Molecular Biometrics, a spin-off company based on IP from David Burns, has received much media attention for its application to in vitro fertilization screening.⁵⁸ Methanol is a cheap alternative to fossil fuels, but it is extremely toxic. C.-J. Li and his colleagues have discovered a green UV photochemical route to convert methanol from agricultural waste into ethanol, which is less harmful than methanol and which releases more energy on combustion.⁵⁹ In another project, Theo van de Ven and J.-P. Lumb have developed a process to make textiles from cellulose that could ultimately benefit the Canadian forestry industry greatly.⁶⁰ They have managed to eliminate the use of CS₂ in the conventional rayon spinning process to produce a fiber that is easily colored. Using their new spinneret equipment, they hope to produce enough fiber to make an actual piece of clothing. Also, Thomas Di Nardo (M.Sc.) and Audrey Moores have developed a new method, based on mechanochemistry and aging, to turn the chitin extracted from lobster shells into chitosan, a polymeric compound that has interesting mechanical properties. This material may eventually be employed in new food packaging and high-value fibers.⁶¹ Tomislav Friscic's and Masad Damha's groups have together recently filed a patent application for an efficient mechanochemical technique for the rapid conversion of cellulose into glucose, and the synthesis of DNA from nucleotide building blocks.⁶² Several of our former graduate students have founded successful companies, including Steve Barnett (Butler) – Barnett Technical Services in Elk Grove, California; Theresa Dankovich (Gray) – Folia Water in New York City, which makes “drinkable books” – water filters impregnated with silver nanoparticles.⁶³



Drinkable books

Masad Damha and collaborators (University of Vienna) have manufactured the first “RNA chip” using photolithography and novel RNA building blocks.⁶⁴ Jean-Philip Lumb’s group has succeeded in improving the efficiency of a 1,2-oxy-amioarene synthesis by combining the biosynthetic production of pigments (melanogenesis) and collagen fibers in a one-pot, chemical process at room temperature in which H₂O is the only by-product.⁶⁵ 1,2-Oxy-aminoarenes are important chemical groups in several biologically active molecules and advanced materials. Parisa Ariya’s research group has succeeded in developing a new two-step process to remove and recycle mercury from spent compact fluorescent lamps.⁶⁶ Bruce Arndtsen and his coworkers have discovered a new and general metal-catalyzed carbonylative method to convert feedstock reagents into ketones and ketone-based pharmaceuticals.⁶⁷

The spin-off company, Anomera, co-founded by Mark Andrews and three former McGill Chemistry students (Monika Rak, Tim Morse and Mary Bateman), has been the recent winner of the Green Centre Canada Innovation House Chemistry Countering Climate Change (IHC4) Competition.^{68,69} This company is interested in converting raw biomass and Canadian forestry products into proprietary, biodegradable, high performance cellulose materials that are competitive alternatives to some artificial cosmetic ingredients. The resulting nanocrystalline product, DextraCell, is marketed as an aqueous suspension or as a dry powder.⁷⁰



Anomera

1.13 Patents

Over the years, many other former graduate students and faculty members have been extremely active in the patent field. One of the earliest examples is that of T. Sterry Hunt, who in the 1950s was a professor at McGill and also worked for the Geological Survey of Canada. In 1857, he invented the green chromium oxide (Cr₂O₃) ink that is still used today for US dollar bills (“greenbacks”).⁷¹ Another important early example is the 1937 US patent no. 2069185 by Harold Hibbert and George H. Tomlinson

Jr. on manufacture of vanillin from waste sulphite pulp liquor. Their process is used commercially for making artificial vanillin, which is used as a flavoring agent.⁷² Another well-known graduate, Richard H. Tomlinson (Ph.D. 1948), has had several patents as the founder of Gennum Corp., a Canadian manufacturer of semiconductor-based products.⁷³ As mentioned earlier, Tomlinson is a major benefactor to McGill University. Yet another graduate, David B. Pall, invented the leukoreduction filter that led to the formation of the Pall Corp.,⁷⁴ based in New York. His invention ultimately resulted in his induction into the National Inventors Hall of Fame in the US in 1990. This filter removes leukocytes (white blood cells) from blood, which is especially important in blood transfusions.



David B. Pall and an example of a Pall Corp. filtration system

In 1953, Vernon K. Krieble invented the anaerobic sealant known as “super glue” and subsequently formed the Loctite Corp.⁷⁵ His grandson, Fred Krieble, supported the Department of Chemistry in the 1990s in setting up the undergraduate computer laboratory (Krieble Corners); Vernon passed away in 2018.

Numerous patents have been filed by recent faculty members, including Damha (20), Chan (18), Li (5), Burns (5), Auclair (4), Just (4), Eisenberg (3), Friscic (3), Hay (3), Sleiman (3) and Andrews (2) just to mention a few. Moreover, several former undergraduate students have also become successful inventors. For example, Leonard Pinchuk, who went on from McGill to complete his Ph.D. at the University of Miami, has almost 130 patents, among them patents for the nylon 12 balloon material currently used in coronary angioplasty.⁷⁶ Pinchuk’s efforts have recently been recognized by him being a co-winner of 2019 Fritz J. and Dolores H. Russ Prize, the world’s premier prize for Bioengineering.

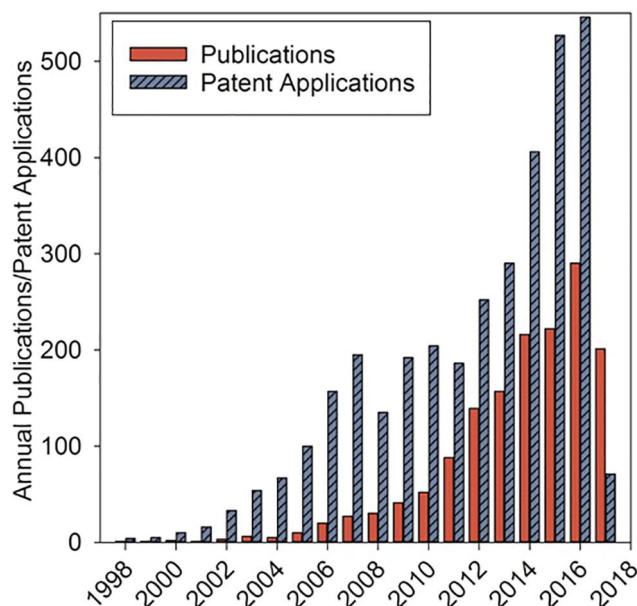
Cellulose, the most abundant biomaterial on the planet, has always been a subject of interest in



Vernon J. Krieble and some examples of Loctite products

the department. Most of the work has taken place in the Pulp and Paper Building, at 3420 University Street. The interest in nanocellulosic materials has been spurred by the granting of a patent to Revol, Godbout and Gray [US patent 5,629,055 May 13, 1997], showing that cellulose nanocrystals, with dimensions in the nanometer range, could be used to prepare solid films of essentially pure cellulose, but with the beautiful optical properties of cholesteric liquid crystals. At the same time, the chemistry graduate student Xue Min Dong (from Gray's group) published the first quantitative measurements of the liquid crystalline phase separation process and the chiral nematic properties of aqueous cellulose nanocrystal suspensions. The interest was such that Paprican (now FPIInnovations) decided to scale up the production of cellulose nanocrystals, first to lab scale and then to pilot plant quantities. The Paprican team was led by Dr. Richard Berry (Bolker) and included Dr. Stephanie Beck (Gray). With support from the Federal and Provincial Governments and from private industry, the world's first nanocellulose production facility officially opened in Windsor, QC in January, 2012. A company, CelluForce, jointly owned by a number of partners, was established to manufacture and develop markets for cellulose nanocrystals. The CelluForce Windsor plant received a major upgrade that was completed in early 2019, and now can produce 300 tonnes per year of a range of grades to suit customers' needs.⁷⁷ Although the initial impetus for scale-up was potential uses as iridescent photonic materials, a very much broader range of applications, from composite reinforcements to viscosity control fluids, hydrogels and aerogels have been proposed. Some idea of the expanding interest in cellulose nanocrystals is shown by the numbers of patents and scientific publications shown below. It should also be noted that Derek Gray received the Marcus Wallenberg Prize in 2013 from the King of Sweden for cellulose

nanocrystal research.



Annual cellulose nanocrystal publications (red) and patent applications (blue stripes) from 1998 to 2017 (compiled August 2017). Publication and patent searches were conducted using Web of Science and Patsnap databases, respectively, using the synonyms: cellulose nanocrystal, cellulose nanowhisker, and nanocrystalline cellulose.⁷⁸

There are now other pilot and commercial-scale plants in Canada, the US, and Sweden making cellulose nanocrystals. A major part of the current commercial activity is on nanocellulosic materials composed of long, nanometer thick cellulose nanofibrils prepared by mechanical action, usually with some chemical or enzymatic pre-treatment. Again, pilot and production scale plants are now operating in Canada, the UK, Sweden, Norway, Finland, France, Switzerland, Brazil and China. In this area, Japan has assumed a leadership role in terms of tonnage of nanocellulose produced and commercial applications in the marketplace. And, recently (Oct. 2019) the Japanese government demonstrated a concept car, the “Nanocellulose Vehicle”, (Japan NCV) produced by a consortium of Japanese vehicle manufacturers with researchers at Kyoto University. The producers claimed a significant weight saving due to the strength and low density of the nanocellulose reinforced materials compared to glass- or carbon-fibre reinforced materials. According to a recent independent study, the global market for nanocellulose, which was valued at US\$285 million in 2018, should more than double to reach US\$661 million in 2023 (a projected annual growth rate of 18.4%).

1.14 Administrative and Technical Staff

The Department of Chemistry would not have been able to achieve the success that it has over the years without the support of dedicated academic associates and secretarial, technical and undergraduate laboratory staff. There have been numerous people in these positions over the past 55 years. Among them Carol Abbot, Sandra Aerssen, Carol Amromin, Bill Bastien, Mathieu Bedard, Joan Birnie, Carole Brown, Aline Charade, Rénee Charron, Genevieve Clarke, June Connolly, Chris Coyle, Josie D'Amico, Mike Daoust, Patrick Davidson, Linda del Paggio, C. E. Drover, J. Eales, Gordon Eccles, Jacky Farrell, John Finkenbine, Petr Fiurasek, D. Fortin, Carrie Foz, G. Frederick, A. Gamliel, Roland Gaulin, Jean-Philippe Guay, Jan Hamier, D. Hart, J. Hayes, H. Hayden, Elva Heyge, Paulette Hénault, C. Hunt, Mitchell Huot, Michel Issid, D. Jeffries, Madeleine Jenson-Fontaine, Vicki Keirl, R. Klein, Alfred Kluck, Georges Kopp, Grace Koryszko, Sandra Lalli, J. Lang, I. Lantos, Catherine Leclerc, Colleen MacNamee, Jennifer Marleau, Chantal Marotte, Allison McCaffrey, Christine McFarlane, Fred Morin, Fay Nurse, R. Oder, L. Perrault, Mario Perrone, Claude Perryman, L. Polak, Mohini Ramkaran, Otis Ramka, Frank Rothwell, Richard Rossi, Nadim Saadeh, Francoise Sauriol, Bhinesha Seetaran, Badway Shaa'th, Parvin Shaikh, David Shimoni, Tara Sprules, Robin Stein, Samantha Stratton, T. Striegler, Stephanie Trempe, Danielle Vlaho, Alexander Wahba, Weihua Wang, Grazyna Wilczek, Robert Workman, Paul (Zhicheng) Xia and Julian Zhu should be especially mentioned.

Nat Moss, who was working at Atomic Energy of Canada Ltd. in Chalk River in the 1960s, was recruited into the Department by Leo Yaffe to become the first Building Director of the Otto Maass Building when it opened in 1965. The most recent major renovations to both this building and the adjacent PPRIC building, which is now almost completely dedicated to Chemistry, were steered most ably by the two subsequent Building Directors, Normand Trempe and Jean-Marc Gauthier.

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- (68) For more details, see: <https://www.mcgill.ca/chemistry/channels/news/spinoff-anomera-winner-greencentre-canada-innovation-house-chemistry-countering-climate-change-ihc4-264542>. Accessed July 29, 2019.
- (69) For more details, see: <https://www.mcgill.ca/chemistry/channels/news/spinoff-anomera-winner-greencentre-canada-innovation-house-chemistry-countering-climate-change-ihc4-264542>. Accessed July 29, 2019.
- (70) For more details on Anomera, see: <https://www.anomera.ca>. Accessed July 31, 2019.
- (71) For more information about T. Sterry Hunt’s invention, see: <https://www.mysteriesofcanada.com/quebec/us-greenbacks/>. Accessed November 12, 2019.
- (72) For more details, see the article by M. B. Hocking at the University of Victoria, British Columbia entitled “Vanillin: Synthetic Flavoring from Spent Sulfite Liquor. http://diyhpl.us/~nmz787/pdf/Vanillin_Synthetic_Flavoring_from_Spent_Sulfite_Liquor.pdf. Accessed July 29, 2019.
- (73) In 2012, GennumCorp. was purchased by the US-based Semtech Corp. for approximately \$500 million USD. For more details, see <https://www.design-reuse.com/news/28803/semtech-gennum-acquisition.html>. Accessed July 29, 2019.
- (74) For more details on Pall Corp., see: <https://www.pall.com>. Access July 29, 2019.

- (75) For more details on Loctite, see: <https://www.loctite.com/en/meta/meta-nav/location-selector.html>. Access July 29, 2019. Vernon K. Krieble was the first person to receive a Ph.D. degree in Chemistry in 1909.
- (76) For more information on Leonard Pinchuk, see the article by Brenda Branswell in McGill News, Summer 2019, p. 5.
- (77) See <https://www.celluforce.com/en/home/>.
- (78) D. Klemm, E. D. Cranston, D. Fischer, M. Gama, S. A. Kedzior, D. Kralisch, F. Kramer, T. Kondo, T. Lindström, S. Nietzsche, K. Petzold-Welcke and F. Rauchfuss. Nanocellulose as a natural source for ground-breaking applications in materials science: Today's state, Materials Today (Elsevier) 21(7), 720-748 (2018).

Excerpts from Leo Yaffe's History of the Department, 1978

The early history of McGill University is inextricably bound up with that of the Montreal General Hospital and the Faculty of Medicine. Chemistry was taught in the medical school. In 1843, three students enrolled for the B.A. degree took Chemistry classes as part of their studies. T. Sterry Hunt was appointed in 1847 as the first chemist and mineralogist in the newly established Geological Survey of Canada, which had its headquarters in Montreal. He started to give lectures in Chemistry to McGill students. The first person to be appointed as Chair of Chemistry was the physician, Dr. W. Sutherland. In 1851, there were only 6 Arts students registered and Sutherland offered to teach chemistry free of charge to these students. In 1855, William Dawson was appointed as Principal and Vice-Chancellor of the university. He was a truly remarkable scientist, who gave lectures in Chemistry, Agricultural Chemistry, Botany, Zoology, Mineralogy and Geology. T. Sterry Hunt was at this time lecturing at both McGill and Laval University in Quebec City. He taught General and Analytical Chemistry, and also organized the first laboratory course. His courses were given six nights a week from 7:00-8:00 pm. His salary was \$800 per year and he supplemented his income by being the Chief Chemist in the Geological Survey of Canada. He was permitted to charge \$20 per student for each course.

In 1869, G. P. Girdwood was appointed as a Lecturer in Practical Chemistry. Three years later, Bernard J. Harrington was also appointed as a Lecturer in Chemistry and, in 1876, he married Principal Dawson's daughter. At this time, he was Professor of Mining and Assaying in Chemistry. He lectured to the women's classes, which were held separately. The next few years saw the appointments of Nevil Norton Evans, Greenshields and R. F. Ruttan. In 1886, the Faculty of Applied Science, now our present Faculty of Engineering, came into being. The same year, T. Sterry Hunt resigned and moved to M.I.T.

as Professor of Geology. Bernard Harrington then became the Chief Chemist in the Geological Survey of Canada.

In 1887, a new Chemistry laboratory was built on campus that could accommodate 120 students and had a separate room for women students. This laboratory was located in the centre of what is now the Arts Building. Five years later, T. Sterry Hunt passed away and left a bequest for scholarships in the Department. These scholarships are still in existence today after over 125 years. At this point, the main function of the Department was teaching. Research came into prominence with the arrival Principal William Macdonald. He donated \$425,000 to the university for the construction of a Chemistry and Mining Building, which was allocated as \$170,00 for construction, \$70,000 for equipment, \$135,000 to operate the building and \$50,000 for the endowment of a chair. This building now houses the School of Architecture. Bernard Harrington became the first Macdonald Professor and Director of the building. G. W. Walker became the second Macdonald Professor and courses started in Industrial Chemistry – the beginning of today's Department of Chemical Engineering. In 1900, Macdonald gave another gift of \$135,000 to provide lecturers, demonstrators and assistants in the Department. Two years earlier, in 1898, Ernest Rutherford arrived and joined the Department of Physics. He promptly immersed himself in the study of radioactivity. He apparently tried to interest Professor Walker and other chemists in his work but they didn't think it was worth supporting. In 1900, Frederick Soddy arrived in Canada, expecting to be appointed as Professor of Chemistry at the University of Toronto, which turned out not to be the case. He decided to visit McGill and met Professor Harrington, who immediately offered him a position as a Senior Demonstrator. Soddy became interested in Rutherford's research that ultimately led to both Rutherford and him being awarded Nobel Prizes in Chemistry in 1908 and 1921, respectively.

The McGill Chemical Society was founded in 1902, paralleling the early formation the McGill Physical Society. Both Rutherford and Soddy spoke to the latter society on "Existence of Bodies Smaller than an Atom" during their time at McGill. Rutherford stayed for the period 1898-1907 and Soddy for the period 1900-1903. It should be mentioned that even in 1961, there was enough radioactivity left in Rutherford's lab in the basement of the now Schulich Library to necessitate the area being completely decontaminated.

In 1907, there were 7 Ph.D. students at the University, only one of whom received the degree – Annie McLeod, as previously mentioned. One year later, Professors Ruttan and Walker recommended

to Principal Peterson the amalgamation of all teaching of Chemistry, except biological and physiological into the Department of Chemistry now housed in the Macdonald Chemistry and Mining Building. This was really the beginning of the existing Department of Chemistry today. Walker retired in 1912 and Professor Ruttan was appointed as the new Director of the building. Collaboration began with the Federal Government Forest Product Laboratory in Montreal – forerunner of the Pulp and paper Institute of Canada (PPRIC). Nevil Norton Evans was a renowned teacher and the author of several textbooks. One of the personalities in the Department was F. M. G. Johnson, who besides being a fine chemist, was a political cartoonist for the Montreal Herald. Several of his drawings decorate the walls in the McGill Faculty Club and in the Ruttan Room in the Otto Maass Building. Ruttan was a founding member of the National Research Council based in Ottawa.

After World War I, in 1919-1920, both Otto Maass and G. S. Whitby were appointed as Assistant Professors of Chemistry. Just after this, in 1921, the will of Mrs. E. B. Eddy was probated leading to the creation of the E. B. Eddy Chair of Industrial and Cellulose Chemistry, initially held by Harold Hibbert, then by Clifford. B. Purves, Arthur S. Perlin and nowadays by Theo van de Ven. Professor Ruttan eventually was appointed as Dean of Graduate Studies, while he was still Director of the Department of Chemistry. Harold Hibbert became world famous because of his research on lignin and cellulose. He held the primary patent on the manufacture of ethylene glycol (antifreeze). Construction of the Pulp and Paper Institute of Canada building at 3420 University Street began in 1927. The site of the building was leased for 40 years and on May 20, 1967, the site and the building reverted to the University. In 1928, F. M. G. Johnson became Director of the Chemistry Department, while also being Dean of the Science Division of the Faculty of arts and Science. In 1933, the Department graduated its 100th Ph.D. student. Among these were Raymond Boyer and R. F. Holcomb, who later became members of staff. In 1935, the University introduced compulsory retirement at age 65, which was later rescinded by the Government of Quebec.

Otto Maass became Head of the Department of Chemistry in 1937. R. V. V. Nicholls and A. S. Ross were appointed as Lecturers, while E. W. R. Steacie resigned as Associate Professor to become Director of the Chemistry Division at the National Research Council. Around the same time Carl Winkler became an Assistant Professor. During World War II, Winkler lectured 15 hours per week, teaching every Physical Chemistry course in the curriculum. In addition, he directed the graduate work of 15-20 Ph.D. students at any one time. In 1942, Raymond Boyer was appointed as Sessional Lecturer.

During the war, he committed a breach of the Official Secrets Act by giving details of the manufacture of the RDX explosive to Canadian communists for transmission to Russia. He was imprisoned for two years after the war and afterwards he became interested in forensic psychiatry and was subsequently reappointed at McGill in this field. Alfred Taurins, who had been a distinguished Chemistry professor at the University of Riga in Latvia was a war-time refugee and he joined the staff at McGill in 1948. He was the professor who first introduced nuclear magnetic resonance (NMR) spectroscopy to the Department. Harold Schiff was appointed as an Assistant Professor in 1950, as was Leo Yaffe in 1952. Leo's first Ph.D. student in radiochemistry was Brian Pate, who graduated in 1955, bringing the total number of Ph.D. graduates from the Department of Chemistry to 500.

Carl Winkler became Chair of the Department of Chemistry in 1955. He hired Jack Edward and Mario Onyszchuk as Lecturers and Alex Schon as an Assistant Professor. Stanley Mason also became associated with the Department as a Research Associate in the PPRIC. Rod Robertson was appointed as an Assistant Professor in 1957. In 1958, Yaffe became the Macdonald Professor of Chemistry. The following year, the Ruttan Room was inaugurated with the aid of donations from his former students and Gene Cave was appointed to the faculty. Around this time, Winkler spearheaded the McGill \$65 million Development Program, which included the Otto Maass Building. He stepped down as Chair of the Department in 1961 and Clifford Purves became the new Chair. He hired Tony Whitehead and George Just in 1962 and, at the same time, Bob Holcomb and John Mennie retired. The latter had been fortunate to do his Ph.D. research under the direction of Frederick Soddy.

Faculty Members, 1965-Present

B.1 Professors

B.1.1 Deceased

Bernard Belleau (Organic Chemistry; 1925-89)

G. Ronald Brown (Polymer Chemistry; 1942-2001)

Gene Cave (Analytical Chemistry; 1912-95)

John (Jack) Edward (Organic Chemistry; 1928-99)

Denis Gilson (Physical Chemistry; 1934-2016)

Allan Hay (Polymer Chemistry; 1929-2017)

James Hogan (Nuclear Chemistry; 1951-2012)

George Just (Organic Chemistry; 1929-2008)

Robert Marchessault (Polymer Chemistry; 1928-2015)

Stanley Mason (Cellulose Chemistry; 1914-87)

Robert Nicholls (Organic Chemistry; 1919-99)

Donald Patterson (Polymer Chemistry; 1927-2016)

Joan Power (Analytical Chemistry; 1958-2019)

Helen Reynolds (General Chemistry; 1904-95)

Rod Robertson (Physical Chemistry; 1921-82)

Archbald Ross (Physical Chemistry)

Alex Sehon (Organic Chemistry; 1935-2018)

David Simkin (Physical Chemistry; 1950-1997)

Leon St. Pierre (Polymer Chemistry; 1924-2018)

Alfred Taurins (Organic Chemistry; 1904-86)

Carl Winkler (Physical Chemistry; 1909-78)

Leo Yaffe (Radiochemistry; 1916-97)

B.1.2 Emeritus or Retired

Ariel E. Fenster (Faculty Lecturer, Office for Science and Society)

Tak-Hang (Bill) Chan (Organic Chemistry)

Adi Eisenberg (Polymer Chemistry)

Byung C. Eu (Theoretical Chemistry)

Patrick G. Farrell (Organic Chemistry)

James Fresco (Analytical Chemistry)

William Galley (Physical Chemistry)

Derek Gray (Cellulose Chemistry)

Arthur E. Grosser (Physical Chemistry)

John F. Harrod (Inorganic Chemistry)

Kelvin K. Ogilvie (Organic Chemistry)

Mario Onyszchuk (Inorganic Chemistry)

Arthur Perlin (Cellulose Chemistry)

William Purdy (Analytical Chemistry)

Eric Salin (Analytical Chemistry)

Bryan Sanctuary (Theoretical Chemistry)

M. Anthony Whitehead (Theoretical Chemistry)

Grazyna Wilczek (Faculty Lecturer)

B.1.3 Resigned

David Burns (Analytical Chemistry; moved to the University of New Brunswick)

Jik Chin (Organic Chemistry; moved to University of Toronto)

Graham Darling (Environmental Chemistry)

Romas Kazlauskas (Organic Chemistry; moved to University of Minnesota)

U. Marcus Lindstrom (Environmental Chemistry, moved back to Lund University, Sweden)

Robin Rogers (Green Chemistry; moved back to the University of Alabama)

Alan G. Shaver (Inorganic Chemistry; moved to Dalhousie and Thompson Rivers Universities)

B.1.4 Current Members of the Department and their Research Areas

Mark Andrews (Materials and Green/Sustainable Chemistry)

Parisa Ariya (Analytical/Environmental)*

Bruce Arndtsen (Synthesis/Catalysis and Green/Sustainable)

Karine Auclair (Chemical Biology, Synthesis/Catalysis and Green/Sustainable)

Christopher Barrett (Analytical/Environmental, Chemical Physics, Materials and Green and Sustainable Chemistry)

Amy Blum (Chemical Physics and Materials)

D. Scott Bohle (Chemical Biology, Synthesis/Catalysis and Green/Sustainable)

Ian S. Butler (Synthesis and Materials)

Gonzalo Cosa (Chemical Biology, Materials, Synthesis/Catalysis and Green/Sustainable)

Masad Damha (Chemical Biology, Synthesis/Catalysis and Green/Sustainable)

Tomislav Friscic (Synthesis/Catalysis and Green/Sustainable)

James Gleason (Synthesis/Catalysis and Green/Sustainable)

David N. Harpp (Synthesis/Catalysis)

Matthew Harrington (Chemical Biology and Materials)

Ashok Kakkar (Materials and Synthesis/Catalysis)

Patanjali Kambhampati (Chemical Physics and Materials)

Rustam Khaliullin (Chemical Physics, Materials and Synthesis/Catalysis)

R. Bruce Lennox (Materials and Synthesis/Catalysis)
Chao-Jun Li (Synthesis/Catalysis and Green/Sustainable)
Nathan Luedtke (Organic Chemistry)
Jean-Philip Lumb (Chemical Biology, Synthesis/Catalysis and Green/Sustainable)
Janine Mauzeroll (Analytical/Environmental, Chemical Biology, Materials)
Eric McCalla (Materials and Green/Sustainable)
Maureen McKeague (Green Chemistry and Molecular Toxicology)*
Anthony Mittermaier (Chemical Biology and Chemical Physics)
Nicolas Moitessier (Chemical Biology and Green/Sustainable)
Audrey Moores (Materials, Synthesis/Catalysis and Green/Sustainable)
Dymtro Perepichka (Materials and Synthesis/Catalysis)
Thomas Preston (Analytical/Environmental)**
Linda Reven (Chemical Physics and Materials)
David Ronis (Chemical Biology and Chemical Physics)***
Lena Simine (Chemical Physics)
Bradley Siwick (Chemical Physics)
Hanadi Sleiman (Chemical Biology, Materials and Synthesis/Catalysis)
Christopher Thibodeaux (Analytical/Environmental, Chemical Biology and Synthesis/Catalysis)
Youla Tsantrizos (Synthesis/Catalysis, Green Chemistry and Chemical Biology)
Paul Wiseman (Chemical Biology and Chemical Physics)***
Theodore van de Ven (Synthesis/Catalysis)

*Joint Appointment with the Department Pharmacology and Therapeutics.

**Joint appointment with the Department of Atmospheric and Oceanic Sciences.

***Joint appointment with the Department of Physics.

B.1.5 University Lecturers , Faculty Lecturers, Academic Associates, Adjunct Professors and Auxiliary Professors

Ashraf Ismail (moved to Food Science and Agricultural Chemistry at the McGill Macdonald College campus)

Jean-Marc Gauthier

Mitchell Huot

Laura Pavelka

Joseph Schwarcz (Director of the Office for Science and Society)

Samuel Sewall (Director of Undergraduate Studies)

Pallavi Sirjoosingh

Danielle Vlaho

Alexander Wahba

Ivor Wharf (retired from Dawson College)

Robert Zamboni (Independent Pharmaceuticals Professional)

B.1.6 Research Associates (Pulp and Paper Research Institute of Canada)

Dimitris Argyropoulos (Wood Chemistry, moved to North Carolina State University)

Henry Bolker (Wood Chemistry, 1927-2013)

R. St. John Manley (Lignin and Cellulose Chemistry)

Richard Mortimer (Wood Chemistry)

A.A. Robinson (Wood Chemistry)

Graduate Students

C.1 Theses Supervised Since 1907

The following table provides the numbers of M.Sc. and Ph.D degrees supervised (or co-supervised) by the Professors of the Department of Chemistry.

Professor	M.Sc.	Co-M.Sc.	Ph.D	Co-Ph.D.	Total Theses
Allen, C.					
Andrews, M.	8	0	7	5	20
Argyropoulos, D.	4	0	2	0	6
Ariya, P.	5	0	7	0	12
Arndtsen, B.	9	1	9	0	19
Auclair, K.	12	1	9	3	20
Barnes, H.					
Barrett, C.	8	1	11	1	21
Belleau, B.	5	0	11	0	16
Bohle, S.	3	0	8	1	12
Bolker, H.	7	1	12	0	20
Boyer, R.	0	0	7	1	8
Brown, G. R.	2	1	8	8	19
Burns, D.	6	0	8	0	14
Butler, I.*	7	1	23	9	40
Cave, G.	4	0	13	0	17
Chan, T. H.	12	0	29	2	43
Chin, J.	5	0	11	2	18

Professor	M.Sc.	Co-M.Sc.	Ph.D	Co-Ph.D.	Total Theses
Damha, M.**	13	0	26	1	40
Darling, G.	0	0	1	2	3
Edward, J.	2	0	25	1	28
Eisenberg, A.	8	0	30	8	46
Eu, B. C.	0	0	8	0	8
Farrell, P.	0	0	8	0	8
Fresco, J.	1	0	6	0	7
Friscic, T.	2	2	2	0	6
Galley, W.	1	1	12	1	15
Gilson, D.	1	0	7	5	13
Gleason, J.	10	3	15	3	31
Goodings, J.	0	0	2	0	2
Goring, D.	1	2	11	3	17
Gray, D.	4	0	17	0	21
Grosser, A.	0	0	3	0	3
Hay, A.	1	0	12	0	13
Harpp, D.	7	0	23	3	33
Harrod, J.	4	0	16	1	21
Hatcher, W.	6	2	10	1	19
Hibbert, H.	7	3	72	2	84
Holcomb, R.	1	0	1	0	2
Hogan, J.	2	0	4	1	7
Ismail, A.	1	0	0	0	1
Johnson, F.	2	6	3	4	15
Just, G.	14	1	68	1	84
Kakkar, A.	9	2	9	4	24
Kambhampati, P.	11	0	12	4	23
Kazlauskas, R.	9	0	8	4	21
Kriebel, V.	0	1	0	1	2
Lennox, B.	6	2	19	5	32
Li, C.-J.	6	1	14	3	24
Lumb, J.-P.	1	0	6	1	8
Maass, O.	1	9	110	11	131
Manley, R.	2	0	8	0	10
Marchessault, R.	1	0	11	1	13
Mason, S.	8	2	40	4	53

Professor	M.Sc.	Co-M.Sc.	Ph.D	Co-Ph.D.	Total Theses
McIntosh, R.					
Mennie, J.					
Mauzeroll, J.	3	0	16	0	19
Mittermaier, A.	3	1	7	1	12
Moitessier, N.	5	1	8	2	16
Moores, A.	3	1	3	2	9
Mortimer, R.					
Nicholls, R.	7	0	30	0	37
Ogilvie, K.	3	0	13	0	16
Onyszchuk, M.	5	0	12	0	17
Patterson, D.	2	0	18	2	22
Perlin, A.	6	0	9	0	15
Perepichka, D.	2	2	6	1	11
Power, J.	0	0	2	0	2
Purdy, W.	3	0	18	0	21
Purves, C.	6	0	75	2	83
Quastel, J.	1	0	35	0	36
Robertson, A. A.	1	0	6	0	7
Robertson, R.					
Reven, L.	4	0	5	2	11
Ronis, D.	0	0	1	0	1
Ross, J.					
Ruttan, R. F.	3	19	2	13	37
Salin, E.	9	1	17	1	28
Sanctuary, B.	2	0	13	2	17
Schiff, H.	3	0	14	1	18
Schon, A.	1	1	19	1	22
Shaver, A.	3	0	10	2	15
Simkin, D.	2	0	11	0	13
Sleiman, H.	6	0	20	3	29
Steacie, E.	2	3	22	2	29
Stevens, P.					
St-Pierre, L.	1	0	6	5	12
Taurins, A.	10	0	27	0	37
Timell, T.	0	0	14	0	14
Tsantrizos, Y.	7	0	4	0	11

Professor	M.Sc.	Co-M.Sc.	Ph.D	Co-Ph.D.	Total Theses
Van de Ven, T.	5	3	9	4	21
Walker, G.	1	3	1	1	6
Whitby, G.	3	10	7	7	27
Whitehead, M. A.	2	2	19	4	27
Winkler, C.	12	0	118	2	126
Wiseman, P.	2	0	5	0	7
Yaffe, L.	2	0	29	3	34

C.2 Table of Graduate Students, 1990-2019

The following table provides the names, degrees, supervising professors, and undergraduate education of all graduates from the department during the period 1990-2019. A list of abbreviations for university names is provided following the table.

Name	Degree	Research Director	Undergraduate Degree
Winter 1990			
Banaszczyk, Mariusz	PhD	Chin	Technical University of Wroclaw, Poland
Berksoy, Mualla	PhD	Whitehead	Middle East Technical University, Turkey
Couture, Lorraine	MSc	van de Ven	Université de Sherbrooke, Canada
Gervais, Lyne	MSc	Salin	McGill University, Canada
Haines, Julian*	PhD	Gilson	Concordia University, Canada
Leonard, Daniele	PhD	Brown	McGill University, Canada
Tsantrizos, Youla	PhD	Ogilvie	McGill University, Canada
Summer 1990			
Barnett, Steven	MSc	Ismail	McGill University, Canada
Koukoulas, Alexander	PhD	Whitehead	McGill University, Canada
Maher, Denise	MSc	Harpp	McGill University, Canada
Soo Lum, Bernadette	PhD	Shaver	UBC, Canada

Name	Degree	Research Director	Undergraduate Degree
Fall 1990			
Colton, Ian Jason	MScA	Onyszychuk	McGill University, Canada
De Merchant, Julie Ann	MScA	Onyszychuk	UNB, Canada
Di Maso, Marie	PhD	Purdy	McGill University, Canada
Guo, Yufei	PhD	Whitehead	National University of Defense Technology, China
Harkness, Brian	PhD	Gray	UBC, Canada
Lebeau, Elaine	MScA	Onyszychuk	Bishop's University, Canada
Li, Zhi	PhD	Galley	Peking University, China
Moore, Andrew	PhD	Chin	McGill University, Canada
Ricard, Serge	MSc	Marchessault	Université Laval, Canada
Schumacher, Gerhard	PhD	van de Ven	McGill University, Canada
St-Jean, Guylaine	PhD	Brown/Patterson	UQAM, Canada
Trepanier, Roland	PhD	Whitehead	McGill University, Canada
Wu, Gaoming	PhD	Brown	Nankai University, China
Winter 1991			
Brown, Andrew	PhD	Simkin	Bishop's University, Canada
Kawai, Stephen*	PhD	Chin/Just	McGill University, Canada
Masson, Jean-Francois	PhD	Manley	UQAM, Canada
Nguyen-Tra, Hong	PhD	Patterson/Delmas	Université de Montréal, Canada
Plouffe, Pierre Yves	PhD	Shaver	Concordia University, Canada
Rocheleau, Marie-Josée	PhD	Purdy	Université de Sherbrooke, Canada
Summer 1991			
Attardo, Giorgio	PhD	Just	Concordia University, Canada
Bosse, Francis	MSc	Eisenberg	UQAM, Canada
Carpenter, Alexis	PhD	Purdy	McGill University, Canada
Jubian, Vrej	PhD	Chin	McGill University, Canada
Kawai, Nancy**	PhD	Butler/Gilson	McGill University, Canada
Paleologou, Michael	PhD	Purdy	Simon Fraser University, Canada
Todd, James Robert	MSc	Hogan	McGill University, Canada
Fall 1991			
Buijs, Thomas	MScA	Onyszychuk	Université Laval, Canada
Dewitt, James	PhD	van de Ven	McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
Doyon, Monique	PhD	Butler	UQAM, Canada
Folkins, Patricia	PhD	Harpp	Dalhousie University, Canada
Mccarthy, Jeffrey	PhD	Purdy	Concordia University, Canada
Mrejen, Karen	MSc	Chin	McGill University, Canada
Mu, Ying	PhD	Harrod	Jilin University, China
Nedea, Maria Elena	PhD	Marchessault	Bucharest University, Romania
Williams, Charles	PhD	Harpp	Acadia University, Canada
Wrinn, Michael	PhD	Whitehead	McGill University, Canada
Winter 1992			
Bi, Honggang	PhD	Just	Zhejiang Medical Univ., China
Blain, Laurent	PhD	Salin	McGill University, Canada
Fruteau, Anne-Marie	PhD	Bolker	Université Toulouse, France
Hebert, Normand	PhD	Just	McGill University, Canada
Ketelson, Howard	MScA	Onyszcuk	McMaster University, Canada
Korell, Ulrich	MSc	Lennox	University of Bonn, Germany
Mcdonald, Lester	MScA	Onyszcuk	York University, Canada
Moss, Pamela Anne	MSc	Salin	McGill University, Canada
St-Denis, Yves	PhD	Chan	Université de Sherbrooke, Canada
Uhm, Hae-Won	PhD	Butler	McGill University, Canada
Yusuf, Said Abdi	MSc	Manley	Somali National University, Somalia
Summer 1992			
Callaghan, Dean	MScA	Onyszcuk	UNB, Canada
Commodari, Fernando	PhD	Sanctuary	McGill University, Canada
Desjardins, Alain	PhD	Eisenberg	McGill University, Canada
Gauvin, Francois	PhD	Harrod	Université de Sherbrooke, Canada
Hambalek, Robert	PhD	Just	Concordia University, Canada
Hird, Bryn	PhD	Eisenberg	Rhodes University, South Africa
Kim, Jung Hee	PhD	Chin	Yonsei University, Korea
Li, Chaojun	PhD	Chan/Harpp	Zhengzhou University, China
Li, Song	PhD	Purdy	Zhengzhou University, China
Molnar, Attila	PhD	Eisenberg	University of Cape Town, South Africa
Nafi, Michael	PhD	Simkin	Oran University, Algeria

Name	Degree	Research Director	Undergraduate Degree
Ng Youn Chen, Christine	MSc	Kazlauskas	McGill University, Canada
Nguyen, Tn Dieu	MSc	Chan	McGill University, Canada
Schwerdtfeger, Annette	PhD	Chan	UBC, Canada
Villamagna, Fortunato	PhD	Whitehead	Concordia University, Canada
Zhao, Shishan*	PhD	Lennox	Jiangxi University, China
Fall 1992			
Baldwin, Jean Ann	MSc	Butler/Gilson	Kingston Polytech, Ireland
Guertin, Kevin	PhD	Chan	Concordia University, Canada
Huang, Yining**	PhD	Butler	Peking University, China
Laberge, Monique	PhD	Simkin	Concordia University, Canada
Parris, Juanita	PhD	Marchessault	Concordia University, Canada
Whittaker, Martin	MSc	Brown	University of St Andrews, UK
Yang, Hu	PhD	Hay	Lanzhou University, China
Winter 1993			
Back, Roberta	PhD	Lennox	McGill University, Canada
Chew, Warren	PhD	Harpp	McGill University, Canada
Guo, Jianxin	PhD	Gray	SCIT, China
Jean Claude, Bertrand	PhD	Just	Université de Moncton, Canada
Strukelj, Marko	PhD	Hay	University of Toronto, Canada
Wei, Ling	MSc	Lennox	Wuhan University, China
Xia, Zheming	PhD	van de Ven	SCIT, China
Summer 1993			
Yeomans, Kevin	MSc	Hay	University of Leeds, UK
Gouin, Jean-Pierre	PhD	Eisenberg	Université de Sherbrooke, Canada
Kim, Whan-Gi	PhD	Hay	Chungnam University, Korea
Lauzier, Christian	PhD	Marchessault	UQAM, Canada
Wang, Daguang	PhD	Just	Shenyang Pharmaceutical University, China
Zhu, Jiayi	PhD	Eisenberg/Lennox	SCIT, China
Fall 1993			
Barbe, Nathalie	MSc	Patterson	Université de Montréal, Canada
Caron, Gaetan	PhD	Kazlauskas	Université de Montréal, Canada
Destine, Jean	MSc	Manley	Université de Montréal, Canada

Name	Degree	Research Director	Undergraduate Degree
Jesudason, Joseph	PhD	Marchessault	Mount Allison University, Canada
Meszaros, Michele	MSc	Eisenberg/Lennox	University of Toronto, Canada
Winter 1994			
Ahmed, Sharmin	MSc	Kazlauskas	McGill University, Canada
Baek, Myung-Gi	MSc	Andrews	Chungnam University, Korea
Bosse, Francis	PhD	Eisenberg	UQAM, Canada
Prystay, Marc	PhD	Power	UBC, Canada
Yu, Youlu	PhD	Brown	Nanjing University, China
Summer 1994			
Barnett, Steven	PhD	Butler	McGill University, Canada
Kamiti, Francis	PhD	van de Ven	McGill University, Canada
Labrecque, Denis	PhD	Chan	Université de Moncton, Canada
Laou, Pik Sai (Eva)	MScA	n/a	Concordia University, Canada
Li, Hongqi	PhD	Butler	Lanzhou University, China
Nguyen, Tn Diep*	PhD	Eisenberg	McGill University, Canada
Olmstead, Jennifer	MSc	Gray	McGill University, Canada
Ren, Jianmin	PhD	Salin	Peking University, China
Fall 1994			
Derbesy, Gerard	PhD	Harpp	ENSCM, France
Ghassemi, Hossein	PhD	Hay	University of Tehran, Iran
Kim, Joon-Seop	PhD	Eisenberg	Korea University, Korea
Meng, Bin	PhD	Just	Beijing Medical University, China
Pearce, Robert	PhD	Marchessault	Concordia University, Canada
Polverari, Marco	PhD	van de Ven	Concordia University, Canada
Quraishi, Omar	MSc	Sanctuary	Concordia University, Canada
Takasaki, Bryan K.*	PhD	Chin	Concordia University, Canada
Villeneuve, Gerald	PhD	Chan/Michel	Université de Sherbrooke, Canada
Xin, Zhili	MSc	Just	Fudan University, China
Winter 1995			
Boily, Helene	PhD	Shaver	Concordia University, Canada
Gallego, Nuria	PhD	Whitehead	University of Barcelona, Spain
Kelemen, Susan	MSc	van de Ven	Concordia University, Canada
Rousseau, Denis	MSc(A)		McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
Serreqi, Alessio	PhD	Kazlauskas	UBC, Canada
Summer 1995			
Kutterer, Kristina	PhD	Just	McGill University, Canada
Linkletter, Barry	PhD	Chin	University of PEI, Canada
Nower, Peter T.	MSc	Just	Concordia University, Canada
Rattray, Vaughn	PhD	Salin	Univ. of the West Indies, Jamaica
Raymond, Louise	PhD	Marchessault	McGill University, Canada
Roman, Miguel A.	MSc	Damha	McGill University, Canada
Trojansek, Darlene	PhD	Shaver	Queen's University, Canada
Fall 1995			
Chan, Kwok Pong	PhD	Hay	Univ. of Hong Kong, Hong Kong
Elce, Edmund	PhD	Hay	Concordia University, Canada
Gao, Chunping	PhD	Hay	Sichuan University, China
Giasson, Julie	PhD	Gray	UQAM, Canada
He, Jiliang	PhD	Harrod	Xiamen University, China
Marentette, Joanne M.	PhD	Brown	McGill University, Canada
Schweitzer, Melodie A.	PhD	Power	Concordia University, Canada
Tadey, Tanya	PhD	Purdy	McMaster University, Canada
Wahnon, Daphne C.	PhD	Chin	Queen's University, Canada
Xin, Shixuan	PhD	Harrod	Inner Mongolia University, China
Winter 1996			
Ali, Anmar	PhD	Chan	Concordia University, Canada
Asgari, Farajollah	MSc	Brown	UNC Greensboro, USA
Bunten, Kevin	MSc	Kakkar	York University, Canada
Caldas, Victor	PhD	Brown	McGill University, Canada
Colton, Ian Jason	PhD	Kazlauskas	McGill University, Canada
Hocking, Philippa J.*	PhD	Marchessault	University of Victoria, Canada
Kanigan, Tanya S.	PhD	Andrews	Carleton University, Canada
Khougaz, Karine	PhD	Eisenberg	McGill University, Canada
Krupa, Joanne C.	PhD	Kazlauskas	University of Toronto, Canada
Li, Sheng	PhD	Eisenberg/Lennox	Chengdu University of Science and Technology, China
Martinez, Coromoto	PhD	Hay	Universidad de Los Andes, Venezuela

Name	Degree	Research Director	Undergraduate Degree
Radiotis, Theodore	PhD	Brown	McGill University, Canada
Scarlete, Mihai V.	PhD	Butler/Harrod	Poitehnica University of Bucharest, Romania
Zheng, Guozhu	PhD	Chan	Fudan University, China
Summer 1996			
Abu Yousef, Imad A.	PhD	Harpp	Yarmouk University, Jordan
Cheung, Man Lung W.	MSc	Chin	Hong Kong University, Hong Kong
Den Auwer, Christophe	PhD	Andrews	Université Paris-Sud, France
El-Khateeb, Mohammad	PhD	Shaver	Yarmouk University, Jordan
Hanley, Shaune John	PhD	Gray	Kingston Polytechnic, UK
Idziak, Irene	PhD	Just	McGill University, Canada
Legere, Jean Guy	PhD	Salin	University of Waterloo, Canada
Qi, Zhigang	PhD	Lennox	UTSC, China
Rafai Far, Adel	MSc	Chan	McGill University, Canada
Singfield, Kathy Lee	PhD	Brown	St. Francis Xavier Univ., Canada
Spencer, Brian	PhD	Purdy	Concordia University, Canada
Zhou, Wen-Qiang	PhD	Just	Wuhan University, China
Fall 1996			
Chisham, Jason E.	MSc	Andrews	UBC, Canada
Badia, Antonella	PhD	Lennox	Concordia University, Canada
Baldwin, Jean Ann	PhD	Butler/Andrews	Kingston Polytechnic, UK
Branagh, Wayne	PhD	Salin	University of Manitoba, Canada
Dinesen, Timothy	PhD	Sanctuary	Queen's University, Canada
Hall, David Andrew	PhD	Shaver	Queen's University, Canada
Isaac, Methvin B.	PhD	Chan	Trent University, Canada
Li, Kuo-Bin	PhD	Sanctuary	National Taiwan Univ., Taiwan
Pereira, Oswy Z.	PhD	Chan	Thames Polytechnic, UK
Uddin, Andre H.	PhD	Damha	University of Toronto, Canada
Wu, Xin	PhD	van de Ven	Fudan University, China
Young, Mary J.	PhD	Chin	Queen's University, Canada
Wang, Jianan	PhD	Simkin	UTSC, China
Winter 1997			
Tong, Samuel	MSc	Kakkar	Western University, Canada

Name	Degree	Research Director	Undergraduate Degree
Cuccia, Louis	PhD	Lennox	McGill University, Canada
Dioumaev, Vladimir K.	PhD	Harrod	Moscow State University, Russia
Marsault, Eric	PhD	Just	ESCOM, France
Skrynnikov, Nikolaj	PhD	Sanctuary	Leningrad State University, Russia
Vreugdenhil, Andrew J.	PhD	Butler	Queen's University, Canada
Webb, Douglas	PhD	Salin	McGill University, Canada
Xu, Jingwei	PhD	Gilson/Butler	Xiangtan University, China
Zhang, Lifeng*	PhD	Eisenberg	Nanjing University, China
Summer 1997			
Bubenik, Monica	MSc	Chan	Memorial University, Canada
Ageev, Sergei	PhD	Sanctuary	Moscow State University, Russia
Al Ghouli, Mazen	PhD	Eu	AUB, Lebanon
Barbiero, Gennaro	PhD	Hay	McGill University, Canada
Dong, Xuemin	PhD	Gray	Nankai University, China
Li, Jinjiang	PhD	Marchessault	Taiyuan Institute of Technology, China
Seo, Jin Seog	PhD	Chin	Inha University, Korea
Skirtach, Andrei	PhD	Simkin	Moscow State University, Russia
Suba, Slaven	PhD	Whitehead	University of Zagreb, Croatia
Vekselman, Alexander	PhD	Darling	Tashkent University, Russia
Wall, Mark James	PhD	Chin	McGill University, Canada
Williams, Christopher	PhD	Whitehead	Concordia University, Canada
Fall 1997			
Noolandi, Peter	MScA	n/a	Queen's University, Canada
Zerrifi, Hisham	MScA	n/a	Oberlin College, USA
Booth, Tristan D.	PhD	Kazlauskas	Sunderland Polytechnic, UK
Chance, Jeffrey	PhD	Purdy	University of Manitoba, Canada
Hubbard, Lise-Lotte	PhD	Darling/Finch	McMaster University, Canada
Stranix, Brent	PhD	Darling/Chin	UNB, Canada
Yannopoulos, Constantin	PhD	Just	Concordia University, Canada
Yoshida, Shu	PhD	Hay	Waseda University, Japan
Winter 1998			
Dracopoulos, John	MSc	Galley/Brown	McGill University, Canada
Guillemette, Virginie	MSc	Arndtsen	Université de Sherbrooke, Canada

Name	Degree	Research Director	Undergraduate Degree
Scartozzi, Margherita	MSc	Damha	Concordia University, Canada
Tomasino, Tonino	MSc	Just	McGill University, Canada
Tuomi, William Victor	MSc	Kazlauskas	University of Victoria, Canada
Warner, Stephanie D.	MSc	Butler	Dalhousie University, Canada
Lepage, Martine	MScA	n/a	Université de Québec à Trois-Rivieres, Canada
Alary, Jean Francois	PhD	Salin	Université de Sherbrooke, Canada
Deakin, Laura	PhD	Andrews	McGill University, Canada
Ding, Yong	PhD	Hay	Dalian Univ. of Technology, China
Heitner, Tara Renee	PhD	Lennox	McGill University, Canada
Hurst, Phillip Currie	PhD	Chin	St. Francis Xavier Univ., Canada
Jiang, Zhihua	PhD	Argyropoulos	Nanjing Forestry University, China
Moffitt, Matthew**	PhD	Eisenberg	McGill University, Canada
Nobes, Geoffrey	PhD	Marchessault	University of Waterloo, Canada
Skinner, Cameron	PhD	Salin	McGill University, Canada
Tardif, Sylvie L.	PhD	Harpp	Université de Montréal, Canada
Summer 1998			
Vanerek, Alois	MScA	n/a	Univ. Pardubice, Czech Republic
Christendat, Dharamdat	PhD	Butler/Gilson	McGill University, Canada
Edwards, Clare M.	PhD	Butler	University of Southampton, UK
Mohamed, Nazim	PhD	Just/Roberts	Portsmouth Polytech, UK
Fall 1998			
Gurney, James A.	MSc	Andrews	McGill University, Canada
Soo, Evelyn Chun-Yin	MSc	Kazlauskas	University of Sunderland, UK
Tuling, Russell John	MSc	Andrews	University of Waterloo, Canada
Yaccato, Karin Jane	MSc	Shaver	McGill University, Canada
Schmitt, Nicole	MScA	n/a	Bishop's University, Canada
Ahvaz, Behzad	PhD	Argyropoulos	Concordia University, Canada
Jin, Yi	PhD	Just	Zhongshan University, China
Leonardi, Lorenzo	PhD	Burns	McGill University, Canada
Ma, Fuyuan	PhD	Lennox	Xiamen University, China
Mandal, Humayun	PhD	Hay	Aligarh Muslim University, India

Name	Degree	Research Director	Undergraduate Degree
Sartoros, Christine	PhD	Salin	McGill University, Canada
Wang, Jianchao	PhD	Just	Hangzhou University, China
Winter 1999			
Desbaumes, Luc	MSc	Eisenberg	ULCB, France
Gass, Heather Jean	MSc	Butler	Mount Allison University, Canada
Hin, Bunda	MSc	Gleason	Université de Montréal, Canada
Choy, Wing Yiu	PhD	Sanctuary	The Chinese University of Hong Kong, Hong Kong
Dickinson, Lucy M.	PhD	Reven	University of Sussex, UK
Farhat, Hikmat	PhD	Eu	AUB, Lebanon
Hamier, Jan	PhD	Salin	McGill University, Canada
Jiang, Lu	PhD	Chan	Sichuan University, China
Petrucchi, Maria	PhD	Kakkar	Concordia University, Canada
Summer 1999			
Kwok, Amy	MSc	n/a	University of Ottawa, Canada
Janes, Lana E.	PhD	Kazlauskas	Harvard University, USA
Jiang, Hongwei	PhD	Kakkar	Sichuan University, China
Robidoux, Sebastien	PhD	Damha	Université de Montréal, Canada
Shu, Ronghua	PhD	Harrod	Anhui University, China
Yam, Chi Ming	PhD	Kakkar	Hong Kong Baptist College, Hong Kong
Fall 1999			
Bhatt, Ulhas	PhD	Just	Kirori Mal College, University of Delhi, India
Lafrance, Danny	MSc	Arndtsen	Université Laval, Canada
Lim, Ngiap Kie	MSc	Arndtsen	McGill University, Canada
Shen, Hongwei	PhD	Eisenberg	Nankai University, China
Williams, Daniel	PhD	Chin	College of William & Mary, USA
Yu, Kui	PhD	Eisenberg	Nankai University, China
Winter 2000			
Allen, Christine J.	PhD	Eisenberg	University of Ottawa, Canada
Aubin, Simon	MSc	Salin/Farant	Université Laval, Canada
Brown, Elizabeth A.	MSc	Salin	McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
Bryan, Vernal	PhD	Chan	Acadia University, Canada
De Souza, Ivan J.	MSc	Argyropoulos	McMaster University, Canada
Halevy, Patrick	MSc	Argyropoulos	Université de Montréal, Canada
Liu, Man Fai A.	MSc	Kazlauskas	McGill University, Canada
Martins, Evelyn O.	MSc	Gleason	McGill University, Canada
Noronha, Anne M.	PhD	Damha	University of Toronto, Canada
Pisegna, Gisla	MSc	Butler	Mount Allison University, Canada
Saracovan, Ilie	PhD	Brown	Politehnica University of Timisoara, Romania
Schultz, Erwin	PhD	Harpp	Université de Montréal, Canada
Somers, Neil	MSc	Kazlauskas	York University, Canada
Weissfloch, Alexandra	PhD	Kazlauskas	McGill University, Canada
Wilds, Christopher*	PhD	Damha	Concordia University, Canada
Summer 2000			
Boubour, Emmanuelle*	PhD	Lennox	UQAM, Canada
Braich, Ravinderjit	PhD	Damha	University of Toronto, Canada
Fafara, Ania Maria	MSc	Burns	Carleton University, Canada
Lu, Yixin	PhD	Just	Fudan University, China
Rah, Kyun-Il	PhD	Eu	Yonsei University, Korea
Fall 2000			
Beaton, Christa R.	MSc	Argyropoulos	Dalhousie University, Canada
Bourg, Marie C.	MSc	Lennox	Université de Lyon, France
Dghaym, Rania	PhD	Arndtsen	AUB, Lebanon
Liscio, Anita	MSc	Damha	McGill University, Canada
Winter 2001			
Cameron, Neil S.	PhD	Brown/Eisenberg	Dalhousie University, Canada
Dolaine, Regis	PhD	Gleason	Juniata College, USA
Long, William F.	PhD	Burns	University of Victoria, Canada
Oliver, Andrew G.	MSc	Kakkar/Arndtsen	Dalhousie University, Canada
Paradis, Michel	MSc	Sleiman	Université de Québec à Trois-Rivieres, Canada
Rybak, Michael E.	PhD	Salin	University of Manitoba, Canada
Summer 2001			

Name	Degree	Research Director	Undergraduate Degree
Burke, Susan E.	MSc	Eisenberg	St. Francis Xavier Univ., Canada
Chaumel, Frederic	MSc	Kakkar	Université de Québec à Rimouski, Canada
Dasgupta, Mohua	MSc	Kakkar	McGill University, Canada
Michaud, Stephanie	PhD	Chan/Gour	McGill University, Canada
Fall 2001			
Chijiwa, Sachiko	MSc	Reven/Eisenberg	McGill University, Canada
Lu, Wenshuo	PhD	Chan	Nankai University, China
Pigeon, Charles	MSc	van de Ven	McGill University, Canada
Saravanamuttu, Kalaichelvi*	PhD	Andrews	McGill University, Canada
Viswanathan, Balakrishnan	MSc	Ariya	McGill University, Canada
Yach, Kimberley A.	MSc	Reven	McGill University, Canada
Yazbeck, Daniel	MSc	Damha	McGill University, Canada
Winter 2002			
Horsman, Geoffrey P.	MSc	Kazlauskas	Univ. of Saskatchewan, Canada
Isakovic, Ljubomir	PhD	Gleason	York University, Canada
Leste-Lasserre, Pierre	PhD	Harpp	ENSCT, France
Magloire, Vladimir	MSc	Kazlauskas	UQAM, Canada
Murphy, Craig E.	PhD	van de Ven	Acadia University, Canada
Peori, Michael B.	MSc	Kakkar	St. Mary's University, Canada
Singh, Shanti	PhD	Lennox	McGill University, Canada
Summer 2002			
Rys, Andrzej Z.	PhD	Harpp	University of Warsaw, Poland
Fall 2002			
Edgar, Catherine D.	PhD	Gray	UBC, Canada
El Halabieh, Rola	MSc	Barrett	AUB, Lebanon
Lugassy, Cyrille M.	MSc	Andrews	Université de Montréal, Canada
Mourani, Rawan	MSc	Damha	Concordia University, Canada
Williams, Celia	PhD	Brown/Galley	Teikyo-Westmar University, USA
Winter 2003			
Dalphond, Jake	MSc	Sleiman	Université de Montréal, Canada

Name	Degree	Research Director	Undergraduate Degree
De Silva, Amila	MSc	Burns	Carleton University, Canada
Fader, Lee David	PhD	Tsantrizos/Damha	Concordia University, Canada
Grewal, Harjap S.	MSc	Kazlauskas	McGill University, Canada
Hannoush, Rami**	PhD	Damha	AUB, Lebanon
Lafrance, Denis	PhD	Burns	Université Laval, Canada
Llewellyn, David B	PhD	Arndtsen	UNB, Canada
Myers, Eddie L.	MSc	Damha/Tsantrizos	Trinity College Dublin, Ireland
Nasreddine, Victor F.	PhD	Reven	AUB, Lebanon
Priefer, Ronny	PhD	Harpp	UNB, Canada
Ravenelle, Francois	PhD	Marchessault	UQAM, Canada
Warner, Stephanie D.	PhD	Butler/Farant	Dalhousie University, Canada
Summer 2003			
Bartels, Carl	PhD	Eisenberg/Kakkar	Simon Fraser University, Canada
Dickie, Adam J.	PhD	Kakkar/Whitehead	University of Calgary, Canada
Garib, Anisha	MSc	Ariya	McGill University, Canada
Lee, Yoon Joo (Julie)	MSc	Chan	McGill University, Canada
Manthorpe, Jeffrey M.	PhD	Gleason	University of Guelph, Canada
Park, Seongsoon	PhD	Kazlauskas	Yonsei University, Korea
Pawsey, Shane	PhD	Reven	Concordia University, Canada
Smith, Kamilah N.	MSc	Argyropoulos	McMaster University, Canada
Fall 2003			
Bazzi, Hassan*	PhD	Sleiman	AUB, Lebanon
Carriero, Sandra	PhD	Damha	McGill University, Canada
Corbett, Andrew D.	PhD	Gleason	St. Mary's University, Canada
Fiurasek, Petr	MSc	Reven	Concordia University, Canada
Goren, Michal	PhD	Lennox	The Hebrew University of Jerusalem, Israel
Mezzetti, Alessandra	PhD	Kazlauskas	University of Bologna, Italy
Norman, Lana L.	MSc	Barrett	UBC, Canada
Zysman-Colman, Eli	PhD	Harpp	McGill University, Canada
Winter 2004			
Agha, Kazim Ally	PhD	Damha	Dalhousie University, Canada
Bourrier, Olivier	PhD	Kakkar	Université de Montpellier/Université de Provence, France

Name	Degree	Research Director	Undergraduate Degree
Choucair, Amira	PhD	Eisenberg	AUB, Lebanon
Gaudreault, Roger	PhD	van de Ven/Whitehead	Université de Québec à Chicoutimi, Canada
Rakotondradany, Felaniaina	PhD	Sleiman/Whitehead	INSA De Rouen, France
Summer 2004			
Burke, E. Diane	PhD	Gleason	Memorial University, Canada
Burke, Susan E.	PhD	Barrett	St. Francis Xavier Univ., Canada
Caputo, Christine	MSc	Auclair	Carleton University, Canada
Cheeseman, Jeremy	PhD	Kazlauskas/Gleason	University of Ottawa, Canada
Corbierre, Muriel K.	PhD	Lennox	ENSCT, France
Dhawan, Rajiv**	PhD	Arndtsen	Simon Fraser University, Canada
Grey, John K.	PhD	Butler	Michigan Tech, USA
Malardier-Jugroot, Cecile	PhD	van de Ven/Whitehead	Université Paul Sabatier, France
Tedeschi, Anna L.	MSc	Damha	McGill University, Canada
Terreau, Owen L.	PhD	Eisenberg	McGill University, Canada
Fall 2004			
Chatain, Guillaume	MSc	Bohle	McGill University, Canada
Gaudineau, Cedric	MSc	Auclair	University of Hertfordshire, UK
Gributs, Claudia	PhD	Burns	McGill University, Canada
Lim Soo, Patrick	PhD	Eisenberg	Concordia University, Canada
Mermut, Ozge	PhD	Barrett	McGill University, Canada
Nguyen, Sophie	PhD	Marchessault	CPE Lyon, France
Vanerek, Alois	PhD	van de Ven	Univ. Pardubice, Czech Republic
Winter 2005			
Ajamian, Alain	PhD	Gleason	Concordia University, Canada
Law, Man Chun (Joe)	MSc	Chan	Hong Kong Polytechnic University, Hong Kong
Mangos, Maria	PhD	Damha	Ryerson University, Canada
Smith, Rashida N.	PhD	Barrett/Reven	McMaster University, Canada
Summer 2005			
Davis, Jason	PhD	Arndtsen	Laurentian, Canada
Meli, Maria-Victoria	PhD	Lennox	McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
Fall 2005			
Arpin, Azelie	MSc	Gleason	UQAM, Canada
Asselin, Julie	MSc	Salin	Université Laval, Canada
Gandubert, Valerie	PhD	Lennox	Université de Bourgogne, France
Morley, Krista	PhD	Kazlauskas/Marchessault	Dalhousie University, Canada
Patureau, Benedicte M.	MSc	Damha	Université d'Avignon, France
Vyhnalkova, Renata	MSc	Eisenberg	Institute of Chemical Technology, Czech Republic
Wu, Qinghua	MSc	Eisenberg	Sichuan University, China
Winter 2006			
Bemben, Kevin John	MSc	Salin	Queen's University, Canada
Cote, Cynthia	MSc	Auclair	UQAM, Canada
Savile, Christopher K.*	PhD	Kazlauskas/Damha	Carleton University, Canada
Summer 2006			
Anderson, Kevin E.	MSc	Kambhampati	University of Waterloo, Canada
Baril, Martin	MSc	Butler	McGill University, Canada
Lee, Yoon Suk	PhD	Lennox	Concordia University, Canada
Mugford, Paul F.	PhD	Kazlauskas/Damha	Memorial University, Canada
Tanchak, Oleh M.	PhD	Barrett	Ryerson University, Canada
Fall 2006			
Ashenhurst, James A.	PhD	Gleason	Queen's University, Canada
Black, Daniel A.	PhD	Arndtsen	Memorial University, Canada
Botros, Lucy Linda	MSc	Burns	McGill University, Canada
Chefson, Amandine	MSc	Auclair	ENSCT, France
Davidson, Patricia	MSc	Lennox/Grutter	McGill University, Canada
Godbout, Christopher P.	MSc	Barrett	York University, Canada
He, Xun	PhD	Chan	Southwest China University, China
Lam, Rebecca	PhD	Salin	McGill University, Canada
Macnab, Finlay C.	MSc	Andrews	McGill University, Canada
Monga, Tanya	MSc	Lennox/Grutter	University of Toronto, Canada
Navasero, Neenah	MSc	Gleason	Simon Fraser University, Canada
Palmer, Alison L.	MSc	Sleiman	UBC, Canada

Name	Degree	Research Director	Undergraduate Degree
Yager, Kevin	PhD	Barrett	McGill University, Canada
Winter 2007			
Beck, Stephanie C.	PhD	Gray	University of Calgary, Canada
Gao, Feng	PhD	Auclair	Wuhan University, China
Palmieri, Benoit	PhD	Ronis	McGill University, Canada
Peng, Changgeng (Paul)*	PhD	Damha	Lanzhou University, China
Smith, Kamilah N.	PhD	Bohle	McMaster University, Canada
Summer 2007			
Beveridge, Ramsay E.	MSc	Arndtsen	Acadia University, Canada
Cernak, Timothy A.	PhD	Gleason	UBC Okanagan, Canada
Eghbali, Nicolas D.	PhD	Harpp/Li	Université de Bordeaux II, France
Haria, Mehul	MSc	Barrett	McMaster University, Canada
Mitra, Debbie	PhD	Damha	University of Manitoba, Canada
Sabatino, David**	PhD	Damha	McGill University, Canada
Stafford, Carolyne N.	MSc	Arndtsen	University of Ottawa, Canada
Fall 2007			
Belanger, Nicolas	PhD	Andrews	McGill University, Canada
Comeau, Jonathan	PhD	Wiseman	St. Francis Xavier Univ., Canada
Czerniewski, Alexandre	MSc	Bohle	McGill University, Canada
Ishihara, Yoshihiro	MSc	Sleiman	McGill University, Canada
Kassam, Adil	PhD	Lennox	Queen's University, Canada
Lazzara, Thomas D.	MSc	van de Ven/Whitehead	McGill University, Canada
Mah, Wayne	MSc	HW Li	University of Calgary, Canada
Mcquinn, Chris	MSc	Wiseman	McGill University, Canada
Oleynik, Paul R.	MSc	Cosa	University of Windsor, Canada
Power, Kristin M.	MSc	Burns	Cape Breton University, Canada
Seivewright, Brian	PhD	Lennox	McGill University, Canada
Zhao, Jin	MSc	Auclair	China University of Petroleum, China/Acadia University, Canada
Winter 2008			
Bachir, Alexia	PhD	Wiseman	AUB, Lebanon
Liu, Xiaojun	MSc	Kakkar	Bishop's University, Canada
Skouta, Rachid	PhD	Li	Université des Sciences, Morocco

Name	Degree	Research Director	Undergraduate Degree
Vassilieff, Tatiana S.	MSc	Kakkar	CPE Lyon, France
Summer 2008			
Cranston, Emily	PhD	Gray	McGill University, Canada
Kolin, David	PhD	Wiseman	McGill University, Canada
Kwok, Chun Shing	MSc	Burns	McGill University, Canada
Nassif, Rachel D.	MSc	Sleiman	University of Ottawa, Canada
Watts, Jonathan K.	PhD	Damha	Dalhousie University, Canada
Fall 2008			
Aldaye, Faisal***	PhD	Sleiman	Dalhousie University, Canada
Bellemare, Marie-Josée	PhD	Bohle	McGill University, Canada
Bilbeisi, Rana A.	MSc	Moitessier	Concordia University, Canada
Demers, Jean-Philippe	MSc	Mittermaier	McGill University, Canada
Esmonde-White, Francis	PhD	Burns	Concordia University, Canada
Isaac, Siara Sarah	PhD	Damha	McGill University, Canada
Li, Zhuo	MSc	van de Ven	University of Toronto, Canada
Li San Cheung, Ken J.	MSc	Lindstrom	McGill University, Canada
Maron, Elizabeth S.	MSc	Andrews	McGill University, Canada
Mcalduff, Michael J.	PhD	Reven	St. Francis Xavier Univ., Canada
Metera, Kimberly L.	PhD	Sleiman	University of Alberta, Canada
Nguyen, Rene V.	PhD	Li	Université de Montréal, Canada
Siamaki, Ali-Reza	PhD	Arndtsen	Islamic Azad University, Iran
Soriano Del Amo, David	PhD	Gleason	McGill University, Canada
Taerum, Tyler A.	MSc	Perepichka	University of Alberta, Canada
Weller, Morag C.	MSc	Gray	Heriot-Watt University, UK
Worrall, Kraig S.	MSc	Arndtsen	UNB, Canada
Winter 2009			
Bonfield, Eric R.	MSc	Li	University of Victoria, Canada
Corbeil, Christopher R.	PhD	Moitessier	St. Mary's University, Canada
Djaghelian, Hagop	MSc	Andrews	Concordia University, Canada
Dorris, Annie	PhD	Barrett	Université de Montréal, Canada
Spina, Carla Jehan	PhD	Bohle	University of Calgary, Canada
Summer 2009			
Darmawan, Hariyanto	MSc	Mittermaier	University of Alberta, Canada

Name	Degree	Research Director	Undergraduate Degree
Englebienne, Pablo	PhD	Moitessier	University of Buenos Aires, Argentina
Kieltyka, Roxanne E.	PhD	Sleiman	University of Toronto, Canada
Lu, Yingdong	PhD	Arndtsen	Peking University, China
Quist, Florence E.	PhD	Kakkar	Université de Montréal, Canada
Yoo, Woo-Jin	PhD	Li	University of Guelph, Canada
Fall 2009			
Basle, Olivier	PhD	Li	Université Rennes 1, France
Cooney, Ryan R.***	PhD	Kambhampati	Univ. of Saskatchewan, Canada
Derrien, Thomas L.	MSc	Lennox	McGill University, Canada
Eltouny, Nermin A.	MSc	Ariya	AUC, Egypt
Hourani, Rami F.	PhD	Kakkar	McGill University, Canada
Hudon, Jonathan	PhD	Gleason	McGill University, Canada
Lafleur, Josiane	PhD	Salin	McGill University, Canada
Lee, Devin A.	MSc	Moitessier	University of Victoria, Canada
Lockwood, Tobias C.	PhD	Perepichka	University of Cambridge, UK
Macleod, Patricia D.	PhD	Li	University of PEI, Canada
Sakalauskas, Marc A.	MSc	Arndtsen	McMaster University, Canada
Sewall, Samuel L.	PhD	Kambhampati	McGill University, Canada
St Cyr, Daniel J.	PhD	Arndtsen	University of Alberta, Canada
Yan, Xuxu	PhD	Auclair	Wuhan University, China
Yang, Hua	PhD	Sleiman	Lanzhou University, China
Zhao, Liang	PhD	Li	Zhengzhou University, China
Winter 2010			
Khanna, Kunal	MSc	Kakkar	Emory University, USA
Lackey, Jeremy G.	PhD	Damha	University of Ottawa, Canada
Lawandi, Janice	PhD	Moitessier	Concordia University, Canada
Riffard, Lucie	MSc	Barrett	Polytech Grenoble, France
Wang, Jun	MSc	Lindstrom	UTSC, China
Summer 2010			
Donga, Robert A.	PhD	Damha	Concordia University, Canada
Hudson, Edward	PhD	Ariya	Trent University, Canada
Huot, Mitchell J.	MSc	Moitessier	University of Alberta, Canada

Name	Degree	Research Director	Undergraduate Degree
Lo, Pik Kwan (Peggy)*	PhD	Sleiman	Hong Kong Baptist University, Hong Kong
Vyhnalkova, Renata	PhD	van de Ven/Eisenberg	University of Chemistry and Technology, Czech Republic
Wahba, Alexander S.	PhD	Damha	McGill University, Canada
Zhao, Bin	MSc	Gleason	Bishop's University, Canada
Fall 2010			
Bourret, Gilles	PhD	Lennox	Université Rennes 1, France
Burger, Melanie	MSc	Gleason/Moitessier	University of Calgary, Canada
Drouin, Christian	PhD	Gleason	Université de Sherbrooke, Canada
Guerette, Elise-Andree	MSc	Ariya	McGill University, Canada
Ivasenko, Oleksandr	PhD	Perepichka	Donetsk National Univ., Ukraine
Kanthasamy, Visahini	MSc	Ariya	McGill University, Canada
Lu, Xiaoyu	PhD	Barrett	Beijing Normal University, China
Ngo, Thien-An	PhD	Cosa	Bryn Mawr College, USA
Priqueler, Julien	PhD	Butler	Teesside University, UK
Schwartzentruber, Jeremy	MSc	Wiseman	University of Victoria, Canada
Si, Lin	PhD	Ariya	Shandong Normal Univ., China
St. Denis, Jeffrey D.	MSc	Gleason	Niagara University, USA
Sun, Xuotong	PhD	Li	Brock University, Canada
Winter 2011			
Farber, Patrick J.	PhD	Mittermaier	McGill University, Canada
Gallant, Pascal	MSc	Damha	McGill University, Canada
Giguere-Bisson, Maxime	MSc	Li	McGill University, Canada
Summer 2011			
Abitbol, Tiffany	PhD	Gray	McGill University, Canada
Cassin, Steven	MSc	Burns	Carleton University, Canada
Freiburger, Lee A.	PhD	Auclair/Mittermaier	McMaster University, Canada
Karam, Pierre Michel*	PhD	Cosa	Lebanese American University, Lebanon
Kondratenko, Mykola	PhD	Perepichka	Donetsk National Univ, Ukraine
Shuai, Qi	PhD	Li	UTSC, China
Tiong, Erica Anne	PhD	Gleason	UBC, Canada

Name	Degree	Research Director	Undergraduate Degree
Fall 2011			
Dion, Jonathan	PhD	Burns	Concordia University, Canada
Goel, Vishya	MSc	Perepichka/Lennox	York University, Canada
Lacroix, Jean-Francois	MSc	Gleason	Université de Moncton, Canada
Lim, Laurie	MSc	Gleason/Moitessier	Carleton University, Canada
Milette, Jonathan	PhD	Reven	Concordia University, Canada
Pandozzi, Fabiano	PhD	Burns	Concordia University, Canada
Stratton, Samantha	MSc	Moore	McGill University, Canada
Troiani, David	PhD	Burns	McGill University, Canada
Yang, Han	MSc	van de Ven	UTSC, China
Winter 2012			
Dias, Eva Alison	PhD	Kambhampati	Western University, Canada
Ladd, Elizabeth	MSc	Kakkar/van de Ven	McGill University, Canada
Larsen, Aaron T.	PhD	Auclair	University of Winnipeg, Canada
Snider, Graydon	PhD	Ariya	Carleton University, Canada
Summer 2012			
Dankovich, Theresa A.	PhD	Gray	Cornell University, USA
Dodd, Erin	PhD	Bohle	Memorial University, Canada
Duford, David	PhD	Salin	Concordia University, Canada
Fortier-McGill, Blythe	PhD	Reven	McMaster University, Canada
Guo, Xiangyu	PhD	Li	Beijing University, China
Luska, Kylie Lukas	PhD	Moore	University of Guelph, Canada
Fall 2012			
Correia, Camille	PhD	Li	University of Toronto (Scarborough), Canada
Krumova, Katerina G.**	PhD	Cosa	Sofia University, Bulgaria
Mahimwalla, Zahid S.	MSc	Barrett	McGill University, Canada
Menard, Amelie	PhD	Auclair	Queen's University, Canada
Ng, Vanessa	MSc	Kakkar	University of Waterloo, Canada
Sabzalian, Zohreh	MSc	van de Ven	McGill University, Canada
Winter 2013			
Azizi, Fereshteh	MSc	Damha	Islamic Azad University, Iran
Dafoe, Andrew Glyn	MSc	Burns	McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
De Schutter, Joris W.	PhD	Tsantrizos	Universiteit Antwerpen, Belgium
Hassler, Matthew R.	PhD	Damha	Univ. of Saskatchewan, Canada
Kong, Matthew C. R.	PhD	Salin	McMaster University, Canada
Langille, Adrienne M.	MSc	Tsantrizos	UNB, Canada
McLaughlin, Christopher K.	PhD	Sleiman	University of Guelph, Canada
Mendoza Sanchez, Rodrigo	PhD	Gleason/Moitessier	UDLAP, Mexico
Morin, Marie	PhD	Arndtsen	Université d'Orléans, France
Tyagi, Pooja	PhD	Kambhampati	University of Delhi, India
Summer 2013			
Aly, Sara	MSc	Arndtsen	Concordia University, Canada
Carneiro, Karina M. M.	PhD	Sleiman	Mount Saint Vincent University, Canada
Chua, Zhijie	PhD	Bohle	National University of Singapore, Singapore
Darabi, Hamed	MSc	Auclair	McGill University, Canada
Habib, Eric	MSc	Auclair/Mittermaier	McGill University, Canada
Hoegl, Annabelle D.	MSc	Auclair	McGill University, Canada
Marko, Ryan	MSc	Cosa	Dalhousie University, Canada
Miletti, Teresa	PhD	Mittermaier	McGill University, Canada
Rizis, Georgios	PhD	van de Ven/Eisenberg	McGill University, Canada
Sailer, Miloslav	PhD	Barrett	University of Manitoba, Canada
Vong, Kenward K. H.	PhD	Auclair	Queen's University, Canada
Fall 2013			
Belliveau, Janet	MSc	Barrett	McGill University, Canada
Chin, Joshua	MSc	Lennox/Schirmacher	McGill University, Canada
Curtis, William	MSc	Kakkar	Dalhousie University, Canada
Deleavey, Glen F.	PhD	Damha	UNB, Canada
Goulet-Hanssens, Alexis	PhD	Barrett	University of Ottawa, Canada
Gu, Yingshan	MSc	Barrett	Nankai University, China
Hachey, Matthew	MSc	Auclair	McGill University, Canada
Hudson, Reuben H.	PhD	Moores/Li	Vassar College, USA
Qi, Feng	MSc	Friscic	Nankai University, China
Regnaud, Aurelie	MSc	Li/Kakkar	McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
Saari, Jonathan I.	PhD	Kambhampati	Queen's University, Canada
Sharma, Anjali	PhD	Kakkar	Guru Nanak Dev University, India
Zhu, Siqi	MSc	Auclair/Mittermaier	University of Waterloo, Canada
Winter 2014			
Castor, Katherine	PhD	Sleiman	Ohio University, USA
Greschner, Andrea A.	PhD	Sleiman	Queen's University, Canada
Gritzalis, Demetrios	MSc	Tsantrizos	Concordia University, Canada
Hamblin, Graham D.**	PhD	Sleiman	University of Calgary, Canada
Kazarine, Alexei	MSc	Salin	McGill University, Canada
Lin, Yih-Shyan	PhD	Tsantrizos	National Cheng Kung University, Taiwan
Mack, Timothy G.	MSc	Andrews	McGill University, Canada
Williams, Benjamin	MSc	Gleason	McGill University, Canada
Summer 2014			
Doyle, Christopher A.	MSc	Gleason	Dalhousie University, Canada
Eltouny, Nermin	PhD	Ariya	AUC, Egypt
Mazurkiewicz, Stephanie	MSc	Mauzeroll	Dalhousie University, Canada
Petitjean, Laurene	MSc	Lumb	McGill University, Canada
Rivalti, Daniel	PhD	Gleason	McGill University, Canada
Ruiz-Wilson, Marx	MSc	Gleason	UDLAP, Mexico
Fall 2014			
Bedard, Mathieu	MSc	Kakkar	McGill University, Canada
Brothers, Laura	MSc	Bohle	St. Francis Xavier Univ., Canada
Desjardins-Langlais, Yann	MSc	Butler	McGill University, Canada
Meneses Ramirez, Erick	PhD	Mittermaier	Universidad Nacional de Colombia, Colombia
Mooney, Jonathan D.	PhD	Kambhampati	McGill University, Canada
Rak, Monika J.	PhD	Moores	University of Manitoba, Canada
Singleton, Thomas A.	PhD	Barrett	Trent University, Canada
Winter 2015			
Bateman, Mary H.	MSc	Moores	Dalhousie University, Canada
Blayney, Alan J.	MSc	Perepichka/Sleiman	McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
Edwardson, Thomas G.*	PhD	Sleiman	University of Edinburgh, UK
Gu, Yuxuan (Wei)	MSc	Bohle	Imperial College London, UK
Katolik, Adam Karol	PhD	Damha	McGill University, Canada
Paul, Mirna	MSc	Bohle	University of Central Florida, USA
Rackov, Andrien A.	PhD	Burns	McGill University, Canada
Ta, Viviane Chou-Yin	MSc	Tsantrizos	University of Ottawa, Canada
Templeton, Erin J.	PhD	Salin	Concordia University, Canada
Tessier, Amelie	MSc	Lennox	McGill University, Canada
Yahyaee Anzahaee, Maryam	PhD	Damha	University of Tehran, Iran
Zahr, Omar Khalil	PhD	Blum	McGill University, Canada
Summer 2015			
Bruhacs, Andrew A.	PhD	Siwick	Johannes Gutenberg University Mainz, Germany
Conway, Justin	PhD	Sleiman	Concordia University, Canada
Dauphin Ducharme, Philippe	PhD	Mauzeroll	UQAM, Canada
Godin, Robert P.	PhD	Cosa	University of Ottawa, Canada
Harris, Jason	MSc	Mittermaier	McGill University, Canada
Korpany, Katalin V.	PhD	Blum	University of Alberta, Canada
Kuss, Sabine	PhD	Mauzeroll	TU Dresden, Germany
Lam, Tina	PhD	Kakkar	McGill University, Canada
Lucate, Josue G.	MSc	Blum	McGill University, Canada
Morse, Timothy	PhD	Andrews	York University, Canada
Rosadiuk, Kristopher	PhD	Bohle	University of Alberta, Canada
Tran, Elisa	MSc	Auclair	University of Waterloo, Canada
Uhlig, Nicholas A. J.	PhD	Li	University of Guelph, Canada
Fall 2015			
Bomal, Enzo	MSc	Kakkar	McGill University, Canada
Bouchard, Adam P.	PhD	Salin	McGill University, Canada
Del Re, Julia	PhD	Blum	McGill University, Canada
Krause, Michael M.	PhD	Kambhampati	Mahidol University International College, Thailand
Madwar, Carolin	PhD	Lennox	Concordia University, Canada

Name	Degree	Research Director	Undergraduate Degree
Mezour, Mohamed A.	PhD	Perepichka/Lennox	UQAM, Canada
Poisson, Joel	PhD	Butler/Bohle	McGill University, Canada
Pottel, Joshua	PhD	Moitessier	McGill University, Canada
Quesnel, Jeffrey S.	PhD	Arndtsen	McGill University, Canada
Sim, Go Eun	PhD	van de Ven	UBC, Canada
Xu, Boran	PhD	Arndtsen	McGill University, Canada
Winter 2016			
Allie, Safiya	MSc	Reven	McGill University, Canada
Bushuyev, Oleksandr***	PhD	Barrett	Odessa University, Ukraine
Chen, Wei Chung	PhD	van de Ven	McGill University, Canada
De Cesco, Stephane	PhD	Moitessier/Mittermaier	ULB, Belgium
Kaldre, Dainis	PhD	Gleason/Moitessier	Latvijas Universitate, Latvia
Kaushik, Madhu	PhD	Moore	Panjab University, India
Kayser, Laure	PhD	Arndtsen	Université Louis Pasteur, France
Leung, Chun Yuen (Carlos)	MSc	Tsantrizos	Concordia University, Canada
Mottillo, Cristina	PhD	Friscic	McGill University, Canada
Schneider, Julia A.	PhD	Perepichka	Southern Connecticut State University, USA
Walsh, Brenna Rae	PhD	Kambhampati	University of Maine, USA
Summer 2016			
Belzile, Mei-Ni	MSc	Cosa	Queen's University, Canada
Dostie, Starr E.	PhD	Guindon/Gleason	Bishop's University, Canada
Glavinovic, Martin J.	MSc	Friscic/Lumb	McGill University, Canada
Hariri, Amani*	PhD	Cosa/Sleiman	AUB, Lebanon
Li, Elizabeth J.	MSc	Lumb	McGill University, Canada
Struyk, Jason P.	MSc	Li	Queen's University, Canada
Yang, Han	PhD	van de Ven	UTSC, China
Fall 2016			
Bezanson, Michelle L. A.	PhD	Moitessier	Dalhousie University, Canada
Conley, Kevin M.	PhD	van de Ven	McGill University, Canada
Danis, Laurence	PhD	Mauzeroll	UQAM, Canada
Fu, Chaoying	PhD	Perepichka	McGill University, Canada
Jackiewicz, Victoria A.	MSc	Arndtsen	University of Ottawa, Canada
Xanthopoulos, Dimitrios	MSc	Tsantrizos	University of Athens, Greece

Name	Degree	Research Director	Undergraduate Degree
Yee, Nathan	MSc	Perepichka	Concordia University, Canada
Winter 2017			
Bogojeski, Jovanka J.	PhD	Damha	Ryerson University, Canada
Bujold, Katherine	PhD	Sleiman	McGill University, Canada
Girard, Simon	PhD	Li	Université Grenoble, France
Gopal, Angelica A.	PhD	Wiseman	University of Nottingham, UK
Habibian, Maryam	PhD	Damha	Alzahra University, Iran
Kurian, Jerry	MSc	Moitessier	McMaster University
Lacbay, Cyrus M.	PhD	Tsantrizos	University of the Philippines Los Baños, Philippines
Lau, Kai Lin	PhD	Sleiman	McGill University, Canada
Malek-Adamian, Elise	MSc	Damha	University of Ottawa, Canada
Palermo, Anthony F.	MSc	Gleason	McMaster University, Canada
Rousina-Webb, Alexander	MSc	Sleiman	Queen's University, Canada
Schiavini, Paolo	PhD	Moitessier/Auclair	Università Studi di Pavia, Italy
Tan, Davin	PhD	Friscic	National University of Singapore, Singapore
Summer 2017			
Bayram, Serene S.	PhD	Blum	Université Libanaise, Lebanon
Calver, Christina F.	PhD	Cosa	Univ. of Saskatchewan, Canada
Dai, Xijie	PhD	Li	Donghua University, China
Esguerra, Kenneth V.	PhD	Lumb	University of Toronto, Canada
Glembockyte, Viktorija	PhD	Cosa	Jacobs University, Germany
Greene, Lana E.	PhD	Cosa	Dalhousie University, Canada
Liu, Mingxin	PhD	Li	Tsinghua University, China
Malca, Michael	MSc	Moore's/Friscic	McGill University, Canada
Payliss, Brandon J.	MSc	Mittermaier	University of Calgary, Canada
Polcari, David	PhD	Mauzeroll	McGill University, Canada
Tjutrins, Jevgenijs	PhD	Arndtsen	Latvijas Universitate, Latvia
Vlaho, Danielle K.	PhD	Damha	Queen's University, Canada
Fall 2017			
Abou Assi, Hala N.*	PhD	Damha	AUB, Lebanon
Chang, Justin H.-C.	MSc	Auclair	UBC, Canada
Christopherson, Jan-C.	MSc	Friscic/Barrett	McGill University, Canada

Name	Degree	Research Director	Undergraduate Degree
Halloran, Matthew W.	MSc	Lumb	Wilfrid Laurier University, Canada
Hiltz, Jonathan	PhD	Lennox/Andrews	McGill University, Canada
King, Catherine	MSc	Rogers/Andrews	University of Alabama, USA
Liu, Wenbo	PhD	Li	UTSC, China
Liu, Zhaomin	PhD	Moitessier	Taiyuan University of Technology, China
Rahbani, Janane F.	PhD	Sleiman	Université Libanaise, Lebanon
Seiler, Helene	PhD	Kambhampati	EPFL, Switzerland
Tomberg, Anna	PhD	Moitessier	McGill University, Canada
Winter 2018			
Chidchob, Pongphak	PhD	Sleiman	Korean Advanced Institute of Science and Technology, Korea
Hughes, Jonathan M.	PhD	Gleason	University of Regina, Canada
Summer 2018			
Brosseau, Patrick	MSc	Kambhampati	McGill University, Canada
Dinardo, Thomas	PhD	Moore	University of Ottawa, Canada
Guan, Jinming	PhD	Auclair	Nankai University, China
Harkness, Robert W.	PhD	Mittermaier	Queen's University, Canada
Janmamode, Naela	PhD	Moitessier	Université Rennes 1, France
Polic, Vanja	PhD	Auclair	University of Waterloo, Canada
Vincent, Felix	MSc	Tsantrizos	UQAM, Canada
Fall 2018			
Albertson, Anna	PhD	Lumb	McGill University, Canada
Avakyan, Nicole	PhD	Sleiman	McGill University, Canada
Bousmail, Danny	PhD	Sleiman	York University, Canada
De La Higuera Macias, Maximiliano	MSc	Arndtsen	UDLAP, Mexico
Di Trani, Justin M.	PhD	Mittermaier	McGill University, Canada
Haggman, Nicklas O.	PhD	Gleason	Lund University, Sweden
Jethi, Lakshay	PhD	Kambhampati	Amity University Delhi, India
Landry, Michael	PhD	Barrett	UNB, Canada
Luo, Jiaying	MSc	Moitessier	Sun Yat-sen University, China/University of Birmingham, UK

Name	Degree	Research Director	Undergraduate Degree
Rangel-Alvarado, Rodrigo	PhD	Ariya	ITESM, Mexico
Winter 2019			
Carrino, Simone	MSc	Mittermaier	Sapienza Università di Roma, Italy
Ghoshdastidar, Avik	PhD	Ariya	Queen's University, Canada
Hearne, Zoe L.	PhD	Li	The Australian National University, Australia
Hsu, Chu Chia (John)	MSc	Sleiman	McGill University, Canada
Kazarine, Alexei	PhD	Wiseman	McGill University, Canada
Li, Alain	PhD	Moore/Li	ENSCM
Li, Shaodi (Allen)	MSc	Friscic	McGill University, Canada
Lincoln, Richard A.	PhD	Cosa	Acadia University, Canada
Mack, Timothy	PhD	Andrews/Kambhampati	McGill University, Canada
Palato, Samuel	PhD	Kambhampati	Université de Sherbrooke, Canada
Querard, Pierre	PhD	Li	Université Rennes 1, France
Uggowitz, Kevin A.	MSc	Thibodeaux	Concordia University, Canada
Zems, Yaroslav	MSc	Perepichka	McGill University, Canada

*Winkler Award

**Winkler and Ambridge Awards

***Winkler and Ambridge Awards and Governor General's Gold Medal

C.2.1 Undergraduate Degree Abbreviations

AUB: American University of Beirut

AUC: The American University in Cairo

CPE: École Supérieure de Chimie Physique Électronique de Lyon

ENSCM: Ecole Nationale Supérieure de Chimie de Montpellier

ENSCT: Ecole Nationale Supérieure de Chimie de Toulouse

EPFL: Ecole Polytechnique Fédérale de Lausanne

ESCOM: Ecole Supérieure de Chimie Organique et Minérale

SCIT: South China Institute of Technology

TU: Technische Universität

UBC: University of British Columbia

UDLAP: Universidad de las Américas Puebla

ULB: Université Libre de Bruxelles

ULCB: Université Claude Bernard Lyon 1

UNB: University of New Brunswick

UQAM: Université de Québec à Montréal

UTSC: University of Science and Technology of China