







## *Publication Information*

Published by

### **Enrolment Services**

McGill University  
3415 McTavish Street  
Montreal, Quebec, H3A 0C8  
Canada

All contents copyright © 2021 by McGill University. All rights reserved, including the right to reproduce this publication, or portions thereof, in any form.

McGill University reserves the right to make changes to the information contained in this publication - including correcting errors, altering fees, schedules of admission and credit requirements, and revising or cancelling particular courses or programs - without prior notification.

Not all courses are offered every year and changes can be made after publication. Always check the Minerva Class Schedule link at [https://horizon.mcgill.ca/pban1/bwckschd.p\\_disp\\_dyn\\_sched](https://horizon.mcgill.ca/pban1/bwckschd.p_disp_dyn_sched) for the most up-to-date information on whether a course is offered.

1	
2	Postdoctoral Studies, page 9
	Administrative Officers, page 9
	Location, page 9
3	Graduate and Postdoctoral Studies' Mission, page 9
3	Important Dates, page 9
4	Graduate Studies at a Glance, page 10
5	Program Requirements, page 10
6	Graduate Admissions and Application Procedures, page 10
7	Fellowships, Awards, and Assistantships, page 10
8	Postdoctoral Research, page 10
	8.1 Postdocs, page 10
	8.2 Guidelines and Policy for Academic Units on Postdoctoral Education, page 11
	8.3 Vacation Policy for Graduate Students and Postdocs, page 12
	8.4 Leave of Absence for Health and Parental/Familial Reasons, page 12
	8.5 Postdoctoral Research Trainees, page 13
9	Graduate Studies Guidelines and Policies, page 13
10	Graduate Student Services and Information, page 14
11	Information on Research Policies and Guidelines, Patents, Postdocs, Associates, Trainees, page 14
12	Browse



- 
- 12.6 Geography, page 48
    - 12.6.1 Location, page 48
    - 12.6.2 About Geography, page 48
    - 12.6.3 Geography Admission Requirements and Application Procedures, page 50
      - 12.6.3.1 Admission Requirements, page 50
      - 12.6.3.2 Application Procedures, page 50
      - 12.6.3.3 Application Dates and Deadlines, page 51
    - 12.6.4 Geography Faculty, page 51
    - 12.6.5 Master of Science (M.Sc.) Geography (Thesis) (45 credits) , page 52
    - 12.6.6 Master of Science (M.Sc.) Geography (Thesis): Environment (45 credits) , page 52
    - 12.6.7 Master of Science (M.Sc.) Geography (Thesis): Neotropical Environment (45 credits) , page 53
    - 12.6.8 Doctor of Philosophy (Ph.D.) Geography , page 53
    - 12.6.9 Doctor of Philosophy (Ph.D.) Geography: Environment , page 54
    - 12.6.10 Doctor of Philosophy (Ph.D.) Geography: Gender and Women's Studies , page 54
    - 12.6.11 Doctor of Philosophy (Ph.D.) Geography: Neotropical Environment , page 55
  - 12.7 Mathematics and Statistics, page 55
    - 12.7.1 Location, page 55
    - 12.7.2 About Mathematics and Statistics, page 56
    - 12.7.3 Mathematics and Statistics Admission Requirements and Application Procedures, page 57
      - 12.7.3.1 Admission Requirements, page 57
      - 12.7.3.2 Application Procedures, page 57
      - 12.7.3.3 Application Dates and Deadlines, page 58
    - 12.7.4 Mathematics and Statistics Faculty, page 58
    - 12.7.5 Master of Science (M.Sc.) Mathematics and Statistics (Thesis) (45 credits) , page 61
    - 12.7.6 Master of Science (M.Sc.) Mathematics and Statistics (Non-Thesis) (45 credits) , page 61
    - 12.7.7 Doctor of Philosophy (Ph.D.) Mathematics and Statistics , page 61
    - 12.7.8 Doctor of Philosophy (Ph.D.) Mathematics and Statistics: Bioinformatics , page 62
  - 12.8 Physics, page 62
    - 12.8.1 Location, page 62
    - 12.8.2 About Physics, page 62
    - 12.8.3 Physics Admission Requirements and Application Procedures, page 65
      - 12.8.3.1 Admission Requirements, page 65
      - 12.8.3.2 Application Procedures, page 65
      - 12.8.3.3 Application Dates and Deadlines, page 65
    - 12.8.4 Physics Faculty, page 65
    - 12.8.5 Master of Science (M.Sc.) Physics (Thesis) (45 credits) , page 68
    - 12.8.6 Doctor of Philosophy (Ph.D.) Physics , page 68
  - 12.9 Psychology, page 68
    - 12.9.1 Location, page 68
    - 12.9.2 About Psychology, page 68

12.9.3 Psychology Admission Requirements and Application Procedures, page 70

12.9.3.1 Admission Requirements, page 70

12.9.3.2 Application Procedures, page 70

12.9.3.3 Application Dates and Deadlines, page 71

12.9.4 Psychology Faculty, page M.Sc.) .782 Tm(Ps(Thesis) (45 credits) rocedures,)Tj33.407.982 724.62 0 622 Tm( page )Tj520 0.982 724.62 073447 69



## 1 Dean's Welcome

Welcome to Graduate and Postdoctoral Studies (GPS) at McGill. You are joining a community of world-class researchers and more than 10,000 graduate students in over 400 programs. GPS is here to support you from admissions through to graduation and beyond. McGill's approach to graduate education emphasises skills development; we cultivate your academic and professional growth through a variety of workshops, events and experiential learning opportunities. I invite you to consult the [GPS website](#) for information on the range of resources available to graduate students at McGill.

I would like to wish you all the best in your studies at McGill. We are here to make sure that you have the best possible experience.

*Josephine Nalbantoglu, Ph.D.*

*Associate Provost (Graduate Education) and Dean, Graduate and Postdoctoral Studies*

---

## 2 Graduate and Postdoctoral Studies

### 2.1 Administrative Officers

#### Administrative Officers

Josephine Nalbantoglu; B.Sc., Ph.D.(McG.)

**Associate Provost (Graduate Education) and Dean (Graduate and Postdoctoral Studies)**

Lorraine Chalifour; B.Sc., Ph.D. (Manit.)

**Associate Dean (Graduate and Postdoctoral Studies)**

Nathan Hall; B.A., M.A., Ph.D. (Manit.)

**Associate Dean (Graduate and Postdoctoral Studies)**

Russell Steele; B.S., M.S. (Carn. Mell), Ph.D. (Wash.)

**Associate Dean (Graduate and Postdoctoral Studies)**

---

### 2.2 Location

James Administration Building, Room 400

845 Sherbrooke Street West

Montreal QC H3A 0G4

Website: [mcgill.ca/gps](http://mcgill.ca/gps)



**Note:** For inquiries regarding specific graduate programs, please contact the appropriate department.

---

### 2.3 Graduate and Postdoctoral Studies' Mission

The mission of Graduate and Postdoctoral Studies (GPS) is to promote university-wide academic excellence for graduate and postdoctoral education at McGill. GPS provides leadership and strategic direction across the university in close collaboration with the academic and administrative units, and the graduate and postdoctoral community.

---

## 3 Important Dates

For all dates relating to the academic year, consult [mcgill.ca/importantdates](http://mcgill.ca/importantdates).

---

## 4 Graduate Studies at a Glance

Please refer to [University Regulations & Resources > Graduate > : Graduate Studies at a Glance](#) for a list of all graduate departments and degrees currently being offered.

---

## 5 Program Requirements

Refer to [University Regulations & Resources > Graduate > Regulations > : Program Requirements](#) for graduate program requirements for the following:

- Master's Degrees
- Doctoral Degrees
- Coursework for Graduate Programs, Diplomas, and Certificates

---

## 6 Graduate Admissions and Application Procedures

Please refer to [University Regulations & Resources > Graduate > : Graduate Admissions and Application Procedures](#) for information on:

- Application for Admission
- Admission Requirements
- Application Procedures
- Competency in English

and other important information regarding admissions and application procedures for Graduate and Postdoctoral Studies.

---

## 7 Fellowships, Awards, and Assistantships

Please refer to [University Regulations & Resources > Graduate > : Fellowships, Awards, and Assistantships](#) for information and contact information regarding fellowships, awards, and assistantships in Graduate and Postdoctoral Studies.

---

## 8 Postdoctoral Research

Students must inform themselves of University rules and regulations and keep abreast of any changes that may occur. The *Postdoctoral Research* section of this publication contains important details postdoctoral scholars will require during their studies at McGill and should be periodically consulted, along with other sections and related publications.

---

### 8.1 Postdocs

Postdocs are recent graduates with a Ph.D. or equivalent (i.e., Medical Specialist Diploma) engaged by a member of the University's academic staff, including Adjunct Professors, to assist him/her in research.

Postdocs must be appointed by their department and registered with Enrolment Services in order to have access to University facilities (library, computer, etc.).

---

## 8.2 Guidelines and Policy for Academic Units on Postdoctoral Education

Every unit hosting postdocs should apply institutional policies and procedures for the provision of postdoctoral education and have established means for informing postdocs of policies, procedures, and privileges (available at [mcgill.ca/gps/postdocs](http://mcgill.ca/gps/postdocs)), as well as mechanisms for addressing complaints. For their part, postdocs are responsible for informing themselves of such policies, procedures, and privileges.

### 1. Definition and Status

- i. Postdoctoral status will be recognized by the University in accordance with Quebec provincial regulations as may be modified from time to time. The eligibility period for postdoctoral status is up to five years from the date when the Ph.D. or equivalent degree was aw

- i. Postdocs are subject to the responsibilities outlined at [mcgill.ca/students/srr](http://mcgill.ca/students/srr) and must abide by the policies listed at [mcgill.ca/secretariat/policies-and-regulations](http://mcgill.ca/secretariat/policies-and-regulations).
- ii. Each academic unit hosting postdocs should clearly identify postdocs' needs and the means by which they will be met by the unit.
- iii. Each academic unit should assess the availability of research supervision facilities, office space, and research funding before recruiting postdocs.
- iv. Some examples of the responsibilities of the academic unit are:
  - to verify the postdoc's eligibility period for registration;
  - to provide postdocs with departmental policy and procedures that pertain to them;
  - to facilitate the registration and appointment of postdocs;
  - to assign departmental personnel the responsibility for postdoctoral affairs in the unit;
  - to oversee and sign off on the Letter of Agreement for Postdoctoral Education;
  - to ensure that each postdoc has a supervisor, lab and/or office space, access to research operating costs and necessary equipment;
  - to include postdocs in departmental career and placement opportunities;
  - to refer postdocs to the appropriate University policies and personnel for the resolution of conflict that may arise between a postdoc and a supervisor.
- v. Some examples of the responsibilities of the supervisor are:
  - to uphold and transmit to their postdocs the highest professional standards of research and/or scholarship;
  - to provide research guidance;
  - to meet regularly with their postdocs;
  - to provide feedback on research submitted by the postdocs;
  - to clarify expectations regarding intellectual property rights in accordance with the University's policy;
  - to provide mentorship for career development;
  - to prepare, sign, and adhere to a Letter of Agreement for Postdoctoral Education.
- vi. Some examples of the responsibilities of postdocs are:
  - to inform themselves of and adhere to the University's policies and/or regulations for postdocs as outlined at [mcgill.ca/gps/postdocs](http://mcgill.ca/gps/postdocs), [mcgill.ca/students/srr](http://mcgill.ca/students/srr) and the Graduate and Postdoctoral Studies [University Regulations and Resources](#);
  - to submit a complete file for registration to Enrolment Services;
  - to sign and adhere to their Letter of Agreement for Postdoctoral Education;
  - to communicate regularly with their supervisor;
  - to inform their supervisor of their absences.
- vii. Some examples of the responsibilities of the University are:
  - to register postdocs;
  - to provide an appeal mechanism in cases of conflict;
  - to provide documented policies and procedures to postdocs;
  - to provide postdocs with the necessary information on McGill University student services (Postdoctoral Fellows and Scholars) and HR policies and guidelines (Postdoctoral Researchers).

*Approved by Senate, April 2000; revised May 2014; February 2020.*

---

### **8.3 Vacation Policy for Graduate Students and Postdocs**

Graduate students and Postdocs should normally be entitled to vacation leave equivalent to university holidays and an additional total of fifteen (15) working days in the year. Funded students and Postdocs with fellowships and research grant stipends taking additional vacation leave may have their funding reduced accordingly.

*Council of FGSR April 23, 1999*

---

### **8.4 Leave of Absence for Health and Parental/Familial Reasons**

A leave of absence may be granted for maternity or parental reasons or for health reasons (see [University Regulations & Resources > Graduate > : Leave of Absence Status](#) of up to 4 weeks.; F



---

## 10 Graduate Student Services and Information

Graduate students are encouraged to refer to : [Student Services and Information](#) for information on the following topics:

- Service Point
- Student Rights & Responsibilities
- Student Services – Downtown & Macdonald Campuses
- Residential Facilities
- Athletics and Recreation
- Ombudsperson for Students
-

Email: [info.aos@mcgill.ca](mailto:info.aos@mcgill.ca); graduate studies: [graduateinfo.aos@mcgill.ca](mailto:graduateinfo.aos@mcgill.ca)  
Website: [mcgill.ca/meteo](http://mcgill.ca/meteo)

### 12.1.2 About Atmospheric and Oceanic Sciences

The Department of Atmospheric and Oceanic Sciences offers courses and research opportunities in atmospheric sciences and physical oceanography leading to the **M.Sc.** and **Ph.D.** degrees. Research programs borrow from fundamental fields such as mathematics, statistics, physics, chemistry, and computing to address a broad range of topics relating to weather and climate. Examples include:

- atmospheric chemistry;
- climate dynamics;
- cloud and precipitation physics;
- dynamical oceanography and meteorology;
- geophysical turbulence;
- numerical modelling;
- numerical weather prediction;
- ocean carbon budgets;
- sea ice dynamics;
-

background in atmospheric and oceanic sciences are admitted at the Ph.D. 1 level and are required to take an additional five courses in atmospheric and oceanic science, these usually being completed in the first two semesters.

Inquiries should be addressed directly to the



## Professors

P. Ariya; B.Sc., Ph.D.(York) (*James McGill Professor*) (*joint appt. with Chemistry*)

P. Bartello; B.S.c., M.Sc., Ph.D.(McG.)

J.R. Gyakum; B.Sc.(Penn. St.), M.Sc., Ph.D.(MIT)

B. Tremblay; B.Sc., M.Sc.(Car.), Ph.D.(McG.)

M.K. Yau; S.B., S.M., Sc.D.(MIT) (*NSERC/Hydro-Québec Industrial Research Chair in Short-term Forecasting of Precipitation*)

## Associate Professors

F. Fabry; B.Sc., M.Sc., Ph.D.(McG.) (*joint appt. with Bieler School of Environment*)

Y. Huang; B.Sc., M.Sc.(Peking), Ph.D.(Princ.)

D. Kirshbaum; B.Sc.(Ill.-Urbana-Champaign), M.Sc.(Johns Hop.), Ph.D.(Wash.)

T. Merlis; B.Sc.(Col.), Ph.D.(Caltech)

D. Straub; B.Sc., M.Sc.(UL Lafayette), Ph.D.(Wash.)

A. Zuend; Ph.D.(ETH Zurich)

## Assistant Professors

C. Dufour; B.Eng.(ISITV, France), M.Sc.(Toulon), Ph.D.(Grenoble)

T. Preston; B.Sc.(Tor.), M.Sc.(UWO), Ph.D.(Br. Col.) (*joint appt. with Chemistry*)

D. Romanic; B.Sc., M.Sc., Ph.D.(Belgrade), Ph.D.(Western)

I. Tan; B.Sc. (Tor.), Ph.D. (Yale)

## Adjunct Professors

L. Barrie; Ph.D.(Goethe)

M. Buehner; Ph.D. (Dal.)

P. Kollias; Ph.D.(Miami)

H. Lin; Ph.D.(McG.)

L.-P. Nadeau; Ph.D.(McG.)

### 12.1.5 Master of Science (M.Sc.) Atmospheric and Oceanic Sciences (Thesis) (45 credits)

The M.Sc. degree requires a minimum of 45 credits, up to a maximum of 51 credits. The program includes from 9 to 27 credits of coursework (depending on the student's background). Complete or half credit courses are indicated by a 1 or 0.5 next to the course number.

#### Thesis Courses (24 credits)

ATOC 691	(3)	Master's Thesis Literature Review
ATOC 692	(6)	Master's Thesis Research 1
		Master's Thesis Po a 's

ATOC 519*	(3)	Advances in Chemistry of Atmosphere
ATOC 521	(3)	Cloud Physics
ATOC 525	(3)	Atmospheric Radiation
ATOC 530	(3)	Paleoclimate Dynamics
ATOC 531	(3)	Dynamics of Current Climates
ATOC 540	(3)	Synoptic Meteorology 1
ATOC 541	(3)	Synoptic Meteorology 2
ATOC 548	(3)	Mesoscale Meteorology.
ATOC 568	(3)	Ocean Physics
ATOC 626	(3)	Atmospheric/Oceanic Remote Sensing
ATOC 646	(0)	
CHEM 519*	(3)	Advances in Chemistry of Atmosphere

\* Students may select either ATOC 519 or CHEM 519.

Or other courses at the 500 level or higher recommended by the Department's Graduate Program Director.

Students with a strong background in atmospheric or oceanic science, or a Diploma in Meteorology, will take at least the 7-credit minimum. Students with no previous background in atmospheric or oceanic science must take the 20-credit maximum.

### 12.1.6 Master of Science (M.Sc.) Atmospheric and Oceanic Sciences (Thesis): Environment (45 credits)

\*\* This program is currently not offered \*\*

#### Thesis Courses (24 credits)

ATOC 691	(3)	Master's Thesis Literature Review
ATOC 692	(6)	Master's Thesis Research 1
ATOC 694	(3)	Master's Thesis Progress Report and Seminar
ATOC 699	(12)	Master's Thesis

Although registration is not required, students registered in M.Sc. programs are expected to regularly attend one of the student seminar series (ATOC 751D1/D2 or ATOC 752D1/D2) and the Department seminar series during the entire period of their enrolment in the program.

#### Required Courses (6 credits)

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3

#### Complementary Courses (15 credits)

12 credits of Departmental courses chosen from the following:

ATOC 512	(3)	Atmospheric and Oceanic Dynamics
ATOC 513	(3)	Waves and Stability
ATOC 515	(3)	Turbulence in Atmosphere and Oceans
ATOC 519*	(3)	Advances in Chemistry of Atmosphere
ATOC 521	(3)	Cloud Physics
ATOC 525	(3)	Atmospheric Radiation
ATOC 530	(3)	Paleoclimate Dynamics

ATOC 531	(3)	Dynamics of Current Climates
ATOC 540	(3)	Synoptic Meteorology 1
ATOC 541	(3)	Synoptic Meteorology 2
ATOC 568	(3)	Ocean Physics
ATOC 626	(3)	Atmospheric/Oceanic Remote Sensing
ATOC 646	(0)	
CHEM 519*	(3)	Advances in Chemistry of Atmosphere

or another course at the 500 level or higher recommended by the Department's Graduate Program Director.

\* Students may select either ATOC 519 or CHEM 519.

3 credits of MSE courses chosen from the following:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or another course at the 500 level or higher recommended by the Advisory Committee and approved by the Environment Option Committee.

### 12.1.7 Doctor of Philosophy (Ph.D.) Atmospheric and Oceanic Sciences

#### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### Required Courses

(1 credit)

ATOC 700	(1)	Ph.D. Proposal Seminar
ATOC 701	(0)	Ph.D. Comprehensive (General)

#### Complementary Courses (7 credits)

Students are required to take ATOC 751D1 and ATOC 751D2 OR ATOC 752D1 and ATOC 752D2.

1 credit from:

ATOC 751D1	(.5)	Seminar: Physical Meteorology
ATOC 751D2	(.5)	Seminar: Physical Meteorology
ATOC 752D1	(.5)	Atmospheric, Oceanic and Climate Dynamics
ATOC 752D2	(.5)	Atmospheric, Oceanic and Climate Dynamics

And 6 credits from the Department of Atmospheric and Oceanic Sciences, at the 500 or 600 level, as approved by the Graduate Program Director.

---

*section 12.2.5: Master of Science (M.Sc.) Biology (Thesis) (45 credits)*

The Master of Science in Biology is a research-focused program that encompasses a diverse range of topics in biology, from molecules and cells to organisms and ecosystems, including development, behaviour and evolution. Research themes include: (1) molecular, cellular and developmental biology, (2) conservation, ecology and evolution, and (3) neurobiology and behaviour. This program allows students considerable flexibility in their choice of research and coursework and encourages cross-disciplinary thinking.

*section 12.2.11: Doctor of Philosophy (Ph.D.) Biology: Neotropical Environment*

of researchers from McGill and from STRI. Students will complete their research in Latin America, and the NEO's core and complementary courses will be taught in Panama.

### **12.2.3 Biology Admission Requirements and Application Procedures**

#### **12.2.3.1 Admission Requirements**

Admission is based on evaluation by the Graduate Training Committee and on acceptance by a research supervisor who can provide adequate funding for personal and research expenses. Before applying to Graduate Studies in Biology, students should contact professors with whom they wish to study. Research strengths in the Department of Biology include:

1. *Neurobiology and Behaviour*
2. *Molecular, Cellular and Developmental Biology*
3. *Conservation, Ecology, Evolution and Behaviour.*

Prospecti.



**Note:** Applications for Summer term admission will not be considered.

## 12.2.4 Biology Faculty

### Chair

Gregor Fussmann

### Graduate Program Director

Frédéric Guichard

Tamara Western

### Emeritus Professors

Gregory G. Brown; B.Sc.(Notre Dame), Ph.D.(CUNY)

A. Howard Bussey; B.Sc., Ph.D.(Brist.), F.R.S.C.

Robert L. Carroll; B.S.(Mich.), M.A., Ph.D.(Harv.), F.R.S.C.

Ronald Chase; A.B.(Stan.), Ph.D.(MIT)

Rajinder S. Dhindsa; B.Sc., M.Sc.(Punj.), Ph.D.(Wash.)

Jacob Kalf; M.S.A.(Tor.), Ph.D.(Ind.)

Donald L. Kramer; B.Sc.(Boston Coll.), Ph.D.(Br. Col.)

Martin J. Lechowicz; B.A.(Mich. St.), M.S., Ph.D.(Wisc.)

Louis Lefebvre; BSc., M.S., PhD. (U. de Montreal)

Barid B. Mukherjee; B.Sc., M.Sc.(Calc.), M.Sc.(Brigham Young), Ph.D.(Utah)

Gerald S. Pollack; M.A., Ph.D.(Princ.)

Ronald Poole; B.Sc., Ph.D.(Birm.)

Derek Roff; B.Sc.(Syd.), Ph.D.(Br. Col.), F.R.S.C.

Rolf Sattler; B.Sc.(Tübingen), Ph.D.(Munich) F.R.S.C.

### Professors

Ehab Abouheif; B.Sc., M.Sc.(C'dia), Ph.D.(Duke) (*James McGill Professor*)

Graham A.C. Bell; B.A., D.Phil.(Oxf.), F.R.S.C. (*James McGill Professor*)

Lauren Chapman; B.Sc.(Alta.), Ph.D.(McG.) F.R.S.C. (*Distinguished James McGill Professor*)

Gre

### Associate Professors

Thomas E. Bureau; B.Sc.(Calif.), Ph.D.(Texas)

Melania Cristescu; B.Sc., M.Sc.(Ovidius Univ. Constanta, Romania), Ph.D.(Guelph) (*Canada Research Chair in Ecological Genomics of Aquatic Invasions*)

David Dankort; B.Sc., Ph.D.(McM.)

Joseph A. Dent; B.Sc.(Mich.), Ph.D.(Colo.)

Irene Gregory-Eaves; B.Sc.(Vic., BC), M.Sc., Ph.D.(Qu.) (*Canada Research Chair in Fresh Water Ecology & Global Change*)

Paul Harrison; B.Sc.(NUI), Ph.D.(Lond.)

Michael Hendricks; B.A.(Bowdoin), Ph.D.(Sing.) (*Canada Research Chair in Neurobiology & Behaviour*)

Brian Leung; B.Sc.(Br. Col.), Ph.D.(Car.) (*on sabbatical, Fall semester*)

Nam-Sung Moon; B.Sc., Ph.D.(McG.)

Simon Reader; B.A. Hon.(Univ. of Cambridge), Ph.D.(Yale)

Rodrigo Reyes-Lamothe; B.Sc. (Universidad Autonoma de Mexico), Lic.(UNAM), M.Sc.(C'dia), D.Phil.(Oxf.) (*Canada Research Chair in Chromosome Biology*)(*on sabbatical*)

Jon Sakata; B.A.(Cornell), Ph.D.(Texas-Austin, Institute for Neuroscience)

Frieder Schoeck; Dipl.(Erhagen), Ph.D.(Max Planck)

Jacalyn Vogel; M.Sc.(E. Ill.), Ph.D.(Kansas)

Alanna Watt; B.Sc.(C'dia), Ph.D.(Brandeis)

Tamara Western; B.Sc.(Dal.), Ph.D.(Br. Col.)(*on sabbatical*)

Sarah Woolley; B.Sc.(Duke), Ph.D.(Texas-Austin)

Monique Zetka; B.Sc., Ph.D.(Br. Col.)

Hugo Zheng; M.Sc.(Helsinki), Ph.D.(Oxf. Brookes)

### Assistant Professors

Abigail Gerhold; B.A.(Cornell), Ph.D.(Calif., Berk.)

Mélanie Guigueno; B.Sc., M.Sc.(Manit.), Ph.D.(UWO)

Anna Hargreaves; B.Sc.(Trent), MSc.(Calg.), Ph.D.(Qu.)

Arnold Hayer; M.Sc.(ESBS, France), Ph.D.(ETH Zurich)

Tomoko Ohyama; B.Sc., M.Sc.(Keio), Ph.D.(Baylor)

Laura Pollock; M.Sc.(S. Illinois); Ph.D.(Melb.)

Fiona Soper; B.Sc.(Qld.); Ph.D.(Cornell)

Jennifer Sunday; B.Sc.(Br. Col.), Ph.D.(Simon Fraser)

Stephanie C. Weber; B.Sc.(Duke), Ph.D.(Stan.)

### Associate Members

*BioEngineering*: Adam Hendricks

*Centre for Research in Neuroscience*: Donald Van Meyel

*Glen site*: Hugh J. Clarke, Daniel Dufort, David Rosenblatt, Teruko Taketo

*MNI*: Kenneth Hastings

*Physics*: Paul Francois

*Redpath Museum*: Rowan Barrett, David Green, Hans Larsson, Virginie Millien, Anthony Ricciardi

### Adjunct Professors

*BELLUS Health Inc.*: Francesco Bellini; B.Sc.(C'dia), Ph.D.(New Br.)

*Canadian Mountain Network* Norma Kassi

*IRCM*: David Hipfner; B.Sc., Ph.D.(Qu.)



## **Adjunct Professors**

*STRI*: Hector Guzman; M.Sc.(Costa Rica), Ph.D.(Newcastle, UK), William Owen McMillan; B.Sc.(Duke), M.Sc., Ph.D.(Univ. Hawai'i), Rachel Page;

ENVR 585	(3)	Readings in Environment 2
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or 3 credits at the 500 level or higher recommended by the Advisory Committee and approved by the Environment Option Committee.

### 12.2.7 Master of Science (M.Sc.) Biology (Thesis): Neotropical Environment (45 credits)

The McGill-STRI Neotropical Environment Option (NEO) is a research-based option for Masters students in the departments of Anthropology, Biology, Bioresource Engineering, Geography, Natural Resource Sciences, Plant Science, and Political Science at McGill University. NEO is aimed at students who wish to focus their graduate research on environmental issues relevant to the Neotropics and Latin American countries. NEO favors interdisciplinary approaches to research and learning through the participation of researchers from McGill and from STRI. Students will complete their research in Latin America and NEO's core and complementary courses will be taught in Panama. NEO's educational approach seeks to facilitate a broader understanding of tropical environmental issues and the development of skills relevant to working in the tropics.

Whether applying to a Master or a PhD, students are expected to meet all the degree requirements of the department in which they are registered. In addition, NEO students will have to meet the specific requirements of the option.

#### Thesis Courses (36 credits)

BIOL 690	(10)	Master's Thesis Research 4
BIOL 697	(13)	Master's Thesis Research 1
BIOL 698	(13)	Master's Thesis Research 2

#### Required Courses (6 credits)

BIOL 640	(3)	Tropical Biology and Conservation
ENVR 610	(3)	Foundations of Environmental Policy

#### Elective Courses (3 credits)

1 120.446Gat the 500 le



ENVR 614 (3) Mobilizing Research for Sustainability

0-3 credits chosen from:

ENVR 585 (3) Readings in Environment 2  
ENVR 630 (3) Civilization and Environment  
ENVR 680 (3) Topics in Environment 4

or 3 credits at the 500 level or higher recommended by the Advisory Committee and approved by the Environment Option Committee.

### 12.2.11 Doctor of Philosophy (Ph.D.) Biology: Neotropical Environment

Participation in the MSE-Panama Symposium presentation in Montreal is also required.

#### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### Required Courses (12 credits)

BIOL 640 (3) Tropical Biology and Conservation  
BIOL 700 (0) Doctoral Qualifying Examination  
BIOL 702 (6) Ph.D. Seminar  
ENVR 610 (3) Foundations of Environmental Policy

#### Elective Courses (3 credits)

3 credits, at the 500 level or higher, on environmental issues to be chosen in consultation with and approved by the student's supervisor AND the Neotropical Environment Options Director.

### 12.2.12 Doctor of Philosophy (Ph.D.) Biology: Bioinformatics

#### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### Required Courses (9 credits)

BIOL 700 (0) Doctoral Qualifying Examination  
BIOL 702 (6) Ph.D. Seminar  
COMP 616D1 (1.5) Bioinformatics Seminar  
COMP 616D2 (1.5) Bioinformatics Seminar

#### Complementary Courses (6 credits)

Two courses chosen from the following:

BINF 621 (3) Bioinformatics: Molecular Biology  
BMDE 652 (3) Bioinformatics: Proteomics  
BTEC 555 (3) Structural Bioinformatics  
COMP 618 (3) Bioinformatics: Functional Genomics



*Centre for Bone and Periodontal Research*. Synthetic approaches to new materials include research in dendrimers, polynucleic acid architectures, polymers that conduct electrons or light and biopolymers. Polymer and colloid science figure prominently as does research and applications of the chemistry and physical properties of nanostructures. There is significant activity in understanding directed molecular assembly at interfaces and in the application of sophisticated spectroscopic tools to explore them.

#### **Synthesis/Catalysis**

The Synthesis/Catalysis Research Activity Group is a collective that develops state-of-art catalysts, synthetic methodologies, reaction mechanisms, and synthetic routes for organic chemicals, natural products, and materials. The collective's major research activities at McGill include: (1) Development of novel catalysts and catalytic reactions for highly efficient organic synthesis; Green Chemistry. This includes the study and discovery of novel transition-metal catalysts, biological catalysts, nano- and dendrimer-based catalysts for synthetic purposes; new chemical reactivity such as C-H activation, asymmetric catalysis and theory, multi-component reactions and combinatorial chemistry; innovative chemistry in alternative solvents such as water, sub-critical water, ionic liquids, and liquid CO<sub>2</sub>; photocatalytic reactions, reaction mechanisms, and physical organic chemistry; and computational chemistry. (2) Synthesis of biological compounds, organic materials, and natural products. Focus areas are total synthesis of natural products, synthesis of DNA and RNA analogues; synthesis of antiviral and anticancer nucleoside analogues, synthesis of amino acid and peptides; synthesis and study of carbohydrate derivatives; design, synthesis, and study of specialty organic chemical and materials.

#### ***section 12.3.5: Master of Science (M.Sc.) Chemistry (Thesis) (45 credits)***

Please consult the Department for more information about this program.

#### ***section 12.3.6: Doctor of Philosophy (Ph.D.) Chemistry***

Please consult the Department for more information about this program.

### **12.3.3 Chemistry Admission Requirements and Application Procedures**

#### **12.3.3.1 Admission Requirements**

The minimum academic standard for admission to research thesis degree programs is a minimum standing equivalent to a cumulative grade point average (CGPA) of 3.0 out of a possible 4.0 or a GPA of 3.2/4.0 for the last two full-time academic years. Applicants from other institutions should have an academic background equivalent to that of a McGill graduate in the Chemistry Honours/Major programs. If possible, candidates should specify the field of research in which they are interested.

#### **12.3.3.2 Application Procedures**

McGill's online application form for graduate program candidates is available at [mcgill.ca/gradapplicants/apply](http://mcgill.ca/gradapplicants/apply).

See [University Regulations & Resources](#) > Graduate > Graduate Admissions and Application Procedures > : [Application Procedures](#) for detailed application procedures.

#### **FINANCIAL ASSISTANCE**

##### **M.Sc. and Ph.D. Degrees**

Graduate students devote 12 hours per week (contact hours, plus grading of reports, etc.) during the academic session to their teaching duties. Financial assistance during the remainder of the year is provided from research funds. Scholarship holders, such as NSERC or awards of similar value, receive a tuition fee waiver.

##### **12.3.3.2.1 Additional Requirements**

- GRE – may be required for international degrees

##### **12.3.3.3 Application Dates and Deadlines**

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Chemistry and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at [mcgill.ca/gps/contact/graduate-program](http://mcgill.ca/gps/contact/graduate-program).

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.



**Note:** Applications for Summer term admission will not be considered.

All inquiries concerning graduate work in the Department should be addressed to the Director of Graduate Studies, Department of Chemistry.

### 12.3.4 Chemistry Faculty

<b>Chair</b>
D. Perepichka
<b>Director of Graduate Studies</b>
G. Cosa
<b>Emeritus Professors</b>
T.H. Chan; B.Sc.(Tor.), M.A., Ph.D.(Princ.), F.C.I.C., F.R.S.C. A. Eisenberg; B.S.(Wor. Poly.), M.A., Ph.D.(Princ.), F.C.I.C. B.C. Eu; B.Sc.(Seoul), Ph.D.(Brown) D.G. Gray; B.Sc.(Belf.), M.Sc., Ph.D.(Manit.), F.C.I.C. E.D. Salin; B.Sc.(Calif.), Ph.D.(Ore.), F.C.I.C. M.A. Whitehead; B.Sc., Ph.D., D.Sc.(Lond.), F.C.I.C.
<b>Professors</b>
M.P. Andrews; B.Sc., M.Sc., Ph.D.(Tor.) P. Ariya; B.Sc., Ph.D.(York) B.A. Arndtsen; B.A.(Carleton Coll.), Ph.D.(Stan.) K. Auclair; B.Sc.(UQAC), Ph.D.(Alta.) C.J. Barrett; B.Sc., M.Sc., Ph.D.(Qu.) D.S. Bohle; B.A.(Reed), M.Phil., Ph.D.(Auck.) I.S. Butler; B.Sc., Ph.D.(Brist.), F.C.I.C. G. Cosa; B.Sc.(UNRC, Argentina), Ph.D.(Ott.) M.J. Damha; B.Sc., Ph.D.(McG.), F.C.I.C. T. Friš i ; B.Sc.(Zagreb), Ph.D.(Iowa) D.N. Harpp; A.B.(Middlebury), M.A.(Wesl.), Ph.D.(N. Carolina), F.C.I.C. A. Kakkar; B.Sc., M.Sc.(Chan. U., India), Ph.D.(Wat.) R.B. Lennox; B.Sc., M.Sc., Ph.D.(Tor.), F.C.I.C., F.R.S.C. C.J. Li; B.Sc.(Zhengzhou), M.S.(Chin. Acad. Sci.), Ph.D.(McG.), F.R.S.C. N. Luedtke; B.Sc.(Wash.), M.Sc., Ph.D.(Calif. -San Diego) J. Mauzeroll; B.Sc.(McG.), Ph.D.(Texas-Austin) N. Moitessier; M.Sc., Ph.D.(Nancy) D. Perepichka; B.Sc.(Donetsk, Ukraine), Ph.D.(Nat. Aca. Sci., Ukraine) D.M. Ronis; B.Sc.(McG.), Ph.D.(MIT) H. Sleiman; B.Sc.(Beirut), Ph.D.(Stan.) Y.S. Tsantrizos; B.Sc., M.Sc., Ph.D.(McG.) T.G.M. van de Ven; Kand. Doc.(Utrecht), Ph.D.(McG.) P. Wiseman; B.Sc.(St. FX), Ph.D.(UWO)

**Associate Professors**

A.S. Blum; B.A.(Princ.), Ph.D.(Wash.)

J.L. Gleason; B.Sc.(McG.), Ph.D.(Virg.)

P. Kambhampati; B.A.(Carleton Coll.), Ph.D.(Texas-Austin)

J.-P. Lumb; B.Sc.(Cornell), Ph.D.(Calif., Berk.)

A. Mittermaier; B.Sc.(Guelph), Ph.D.(Tor.)

N. Moitessier; M.Sc., Ph.D.(Nancy)

A. Moores; B.Sc., Ph.D.(École Poly., France)

L. Reven; B.A.(Carleton Coll.), Ph.D.(Ill.)

B. Siwick; B.A.Sc., M.Sc., Ph.D.(Tor.)

**Assistant Professors**

M. Harrington; B.A.(Delaw)



CHEM 651	(1)	Seminars in Chemistry 2
CHEM 688	(3)	Progress Assessment 1

### **Complementary Courses**

(9-16 credits)

Students will normally take 9-16 credits of CHEM (or approved) courses at the 500 or 600 level.

## **12.3.6 Doctor of Philosophy (Ph.D.) Chemistry**

### **Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

### **Required Courses**

CHEM 650	(1)	Seminars in Chemistry 1
CHEM 651	(1)	Seminars in Chemistry 2
CHEM 688	(3)	Progress Assessment 1
		Comprehensive Examina

- **Applications:** bioinformatics, machine learning, robotics, computer animation, graphics, and vision.

All students must consult the *graduate program website*, where up-to-date information about the graduate programs is posted. Any questions concerning programs should be addressed to the *Graduate Program Coordinator*.

#### *section 12.4.5: Master of Science (M.Sc.) Computer Science (Thesis) (45 credits)*

This program is designed for students with a strong interest in research in computer science who hold at least the equivalent of an undergraduate minor in CS. This program combines a strong course component with a research thesis. It is the usual (but not mandatory) entry point for students who wish to do a Ph.D., but is also the program of choice for students who want to find challenging and exciting jobs after their master's.

#### *section 12.4.6: Master of Science (M.Sc.) Computer Science (Thesis): Bioinformatics (45 credits)*

Bioinformatics research lies at the intersection of biological/medical sciences and mathematics/computer science/engineering. The intention of the Bioinformatics option is to train students to become researchers in this interdisciplinary field. This includes the development of strategies for experimental design, the construction of tools to analyze datasets, the application of modelling techniques, the creation of tools for manipulating bioinformatics data, the integration of biological databases, and the use of algorithms and statistics.

#### *section 12.4.7: Master of Science (M.Sc.) Computer Science (Non-Thesis) (45 credits)*

This program is designed for students who want to obtain broad knowledge of advanced topics in computer science but without the requirement of a thesis. It offers an excellent preparation for the job market, but is not recommended for students interested in eventually pursuing a Ph.D.

#### *section 12.4.8: Doctor of Philosophy (Ph.D.) Computer Science*

The Ph.D. program trains students to become strong, independent researchers in the field of their choice. Our graduates take challenging positions in industry or take academic positions at universities and research labs. In order to apply to the Ph.D. program, applicants should normally hold a master's degree in Computer Science or a closely related area, from a well-recognized university, but exceptional students can be admitted to the Ph.D. program directly without a master's degree.

#### *section 12.4.9: Doctor of Philosophy (Ph.D.) Computer Science: Bioinformatics*

Bioinformatics research lies at the intersection of biological/medical sciences and mathematics/computer science/engineering. The intention of the Bioinformatics option is to train students to become researchers in this interdisciplinary field. This includes the development of strategies for experimental design, the construction of tools to analyze datasets, the application of modelling techniques, the creation of tools for manipulating bioinformatics data, the integration of biological databases and the use of algorithms and statistics.

### **12.4.3 Computer Science Admission Requirements and Application Procedures**

#### **12.4.3.1 Admission Requirements**

##### **Master's (M.Sc.)**

The minimum requirement for admission is a bachelor's degree (cumulative grade point average (CGPA) of 3.2 out of 4.0 or better, or equivalent) with the coursework in Computer Science as listed on our *website*.

The website supplements the information in this publication, and should be consulted by all graduate students.

##### **Ph.D.**

- [Graduate Record Examination](#) (GRE General Test) – required for degrees from outside Canada. Optional for Ph.D. program.

For further details, consult the [School of Computer Science's website](#)

### 12.4.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the School of Computer Science and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at [mcgill.ca/gps/contact/graduate-program](http://mcgill.ca/gps/contact/graduate-program).

	Application Opening Dates		Application Deadlines	
	All Applicants	Non-Canadian citizens (incl. Special, Visiting & Exchange)	Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)	Current McGill Students (any citizenship)
<b>Fall Term:</b>	Sept. 15	March 1	March 1	March 1
<b>Winter Term:</b> (*Ph.D. only)	Feb. 15*	Sept. 1*	Sept. 1*	Sept. 1*
<b>Summer Term:</b>	N/A	N/A	N/A	N/A

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

For further details on our admission requirements, please visit our website at [www.cs.mcgill.ca/academic/graduate/admission](http://www.cs.mcgill.ca/academic/graduate/admission).



**Scholarship Deadlines:** **January 1** for applicants who wish to be considered for scholarship awards; otherwise, March 1 for admission to the Fall term.

## 12.4.4 Computer Science Faculty

### Director

B. Kemme

### Emeritus Professors

D. Avis; B.Sc.(Wat.), Ph.D.(Stan.)

R. De Mori; Ph.D.(Poli. Torino)

T.H. Merrett; B.Sc.(Qu.), D.Phil.(Oxf.)

M.M. Newborn; B.E.E.(Rensselaer Poly.), Ph.D.(Ohio St.), F.A.C.M.

C. Paige; B.Sc., B.Eng.(Syd.), Ph.D.(Lond.)

D. Thérien; B.Sc.(Montr.), M.Sc., Ph.D.(Wat.)

C. Tropper; B.Sc.(McG.), Ph.D.(Brooklyn Poly.)

### Post-Retirement

N. Friedman; B.A.(UWO), Ph.D.(Tor.)

C. Tropper; B.Sc.(McG.), Ph.D.(Brooklyn Poly.)

G.F.G. Ratzler; B.Sc.(Glas.), M.Sc.(McG.)

### Professors

L. Devroye; M.S.(KU Leuven), Ph.D.(Texas-Austin) (*James McGill Professor*)

G. Dudek; B.Sc.(Qu.), M.Sc., Ph.D.(Tor.) (*James McGill Professor*)

X. Liu; B.Sc., M.Sc.(Tsinghua), Ph.D.(Ill.-Urbana-Champaign) (*William Dawson Scholar*)

P. Panajl 0 0 1 67.52tPh.D.(TBrooklyn PCarn B.Sll0 1 70.52 104.271 Tm77913

**Professors**

M. Robillard; B.Eng.(École Poly., Montr.), M.Sc., Ph.D.(Br. Col.)

K. Siddiqi; B.Sc.(Lafayette), M.Sc., Ph.D.(Brown)

A. Vetta; B.Sc., M.Sc.(LSE), Ph.D.(MIT)

**Associate Professors**

M. Blanchette; B.Sc., M.Sc.(Montr.), Ph.D.(Wash.)

X.-W. Chang; B.Sc., M.Sc.(Nanjing), Ph.D.(McG.)

C. Crépeau; B.Sc., M.Sc.(Montr.), Ph.D.(MIT)

H. Hatami; B.Sc.(SUT, Tehran), M.Sc., Ph.D.(Tor.)

B. Kemme; B.Sc., M.Sc.(Erlangen-Nuremberg, Germany), Ph.D.(ETH, Zurich)

J. Kienzle; Eng.Dip., Ph.D.(EPFL)

P. Kry; B.Sc.(Wat.), M.Sc., Ph.D.(Br. Col.)

M. Langer; B.Sc.(McG.), M.Sc.(Tor.), Ph.D.(McG.)

M. Maheswaran; B.Sc.(Peradeniya), M.Sc., Ph.D.(Purd.)

J. Pineau; B.A.Sc.(Wat.), M.Sc., Ph.D.(Carn. Mell) (*William Dawson Scholar*)

D. Precup; B.Sc.(Tech. U. of Cluj-Napoca), M.Sc., Ph.D.(Mass.)

D. Ruths; B.Sc., M.Sc., Ph.D.(Rice)

C. Verbrugge; B.A.(Qu.), Ph.D.(McG.)

J. Waldispuhl; B.Sc.(Nice Sophia Antipolis), M.Sc.(Paris VII), Ph.D.(École Poly., France)

**Assistant Professors**

O. Balmau; B.Sc., M.Sc. (EPFL), Ph.D. (Sydney)

J. Cheung; B.Sc.(Br. Col.), M.Sc., Ph.D.(Tor.)

C. Dubach; M.Sc.(EPFL), Ph.D.(Edin.)

D. Meger; B.Sc.(Br. Col.), M.Sc.(McG.), Ph.D.(Br. Col.)

J. Guo; B.Sc., M.Sc.(Xian Jiaotong, China), Ph.D.(Notre Dame)

W.L. Hamilton; B.Sc., M.Sc.(McG.), Ph.D.(Stan.)

Y.Li; B.Sc.(Sask.), M.Sc., Ph.D.(Tor.)

H.C. Lin; B.Sc.(Calif. St.), M.Sc.(Alta.), Ph.D.(Edin.)

E. Patitsas; B.Sc.(Br. Col.), M.Sc., Ph.D.(Tor.)

R. Rabbany; B.Sc.(AUT, Iran), M.Sc., Ph.D.(Alta.)

M. Ravanbakhsh; B.Sc.(SUT, Tehran), M.Sc., Ph.D.(Alta.)

S. Reddy; B.Tech.(IIIT Hyderabad), M.S. by Res.(IIIT Hyderabad; York, UK), Ph.D.(Edin.)

B. Richards; B.Sc.(Tor), M.Sc., D.Phil.(Oxf.)

R. Robere; B.Sc.(Nfld.), M.Sc., Ph.D.(Tor.)

D. Rolnick; B.Sc.(MIT), Ph.D.(Freie Universitat Berlin)

X, Si; BE (Nankai University)

**Faculty Lecturer**

G. Alberini; B.Sc., M.Sc.(Universita degli Studi di Padova, Italy), Ph.D.(McG.)

D. Beccerra; B.Sc., M.Sc. (Universidad Nacional de Colombia Bogota)

J. D'Silva; M.Sc. (McG., BTECH CS Cochin University of Science & Technology), Ph.D. (McG.)

J. Vybihal; B.Sc., M.Sc.(McG.)

## Associate Members

L. Addario-Berry (

COMP 553	(4)	Algorithmic Game Theory
COMP 554	(4)	Approximation Algorithms
COMP 560	(3)	Graph Algorithms and Applications
COMP 566	(3)	Discrete Optimization 1
COMP 567	(3)	Discrete Optimization 2
COMP 610	(4)	Information Structures 1
COMP 627	(4)	Theoretical Programming Languages
COMP 642	(4)	Numerical Estimation Methods
COMP 647	(4)	Advanced Cryptography
COMP 649	(4)	Quantum Cryptography
COMP 690	(4)	Probabilistic Analysis of Algorithms
COMP 760	(4)	Advanced Topics Theory 1
COMP 761	(4)	Advanced Topics Theory 2

Category B: Systems

COMP 512	(4)	Distributed Systems
COMP 520	(4)	Compiler Design
COMP 529	(4)	Software Architecture
COMP 533	(3)	Model-Driven Software Development
COMP 535	(4)	Computer Networks 1
COMP 575	(3)	Fundamentals of Distributed Algorithms
COMP 612	(4)	Database Programming Principles
COMP 614	(4)	Distributed Data Management
COMP 621	(4)	Program Analysis and Transformations
COMP 655	(4)	Distributed Simulation
COMP 667	(4)	Software Fault Tolerance
COMP 762	(4)	Advanced Topics Programming 1
COMP 763	(4)	Advanced Topics Programming 2
COMP 764	(4)	Advanced Topics Systems 1
COMP 765	(4)	Advanced Topics Systems 2

Category C: Applications

COMP 521	(4)	Modern Computer Games
COMP 522	(4)	Modelling and Simulation
COMP 526	(3)	Probabilistic Reasoning and AI
COMP 546	(4)	Computational Perception
COMP 550	(3)	Natural Language Processing
COMP 551	(4)	Applied Machine Learning
COMP 557	(4)	Fundamentals of Computer Graphics
COMP 558	(4)	Fundamentals of Computer Vision
COMP 559	(4)	Fundamentals of Computer Animation
COMP 561	(4)	Computational Biology Methods and Research

COMP 564	(3)	Advanced Computational Biology Methods and Research
COMP 579	(4)	Reinforcement Learning
COMP 618	(3)	Bioinformatics: Functional Genomics
COMP 652	(4)	Machine Learning
COMP 680	(4)	Mining Biological Sequences
COMP 766	(4)	Advanced Topics Applications 1
COMP 767	(4)	Advanced Topics: Applications 2

#### 12.4.6 Master of Science (M.Sc.) Computer Science (Thesis): Bioinformatics (45 credits)

##### Thesis Courses (24 credits)

22 credits selected from:

COMP 691	(3)	Thesis Research 1
COMP 696	(3)	Thesis Research 2
COMP 697	(4)	Thesis Research 3
COMP 698	(10)	Thesis Research 4
COMP 699	(12)	Thesis Research 5

##### Required Courses (3 credits)

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar

##### Required Course

COMP 601	(2)	Thesis Literature Review
----------	-----	--------------------------

##### Complementary Courses (18 credits)

6 credits chosen from the following courses:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics
COMP 618	(3)	Bioinformatics: Functional Genomics
PHGY 603	(3)	Systems Biology and Biophysics

12 credits of 4-credit courses chosen from 500-, 600-, or 700-level Computer Science courses in consultation with the candidate's supervisor.

Note: Students with an appropriate background can substitute 4 credits by COMP 697.

#### 12.4.7 Master of Science (M.Sc.) Computer Science (Non-Thesis) (45 credits)

##### Research Project (15 credits)

15 credits selected as follows:

COMP 693	(3)	Research Project 1
COMP 694	(6)	Research Project 2
COMP 695	(6)	Research Project 3

**Required Courses (2 credits)**

COMP 602	(1)	Computer Science Seminar 1
COMP 603	(1)	Computer Science Seminar 2

**Complementary Courses (28 credits)**

28 credits of COMP (or approved) courses at the 500, 600, or 700 level.

Complementary courses must satisfy a Computer Science breadth requirement, with at least one course in two of the Theory, Systems, and Application areas. Areas covered by specific courses are determined by the Computer Science graduate program director.

## Category A: Theory

COMP 523	(3)	Language-based Security
COMP 524	(3)	Theoretical Foundations of Programming Languages
COMP 525	(3)	Formal Verification
COMP 527	(3)	Logic and Computation
COMP 531	(3)	Advanced Theory of Computation
COMP 540	(4)	Matrix Computations
COMP 547	(4)	Cryptography and Data Security
COMP 552	(4)	Combinatorial Optimization
COMP 553	(4)	Algorithmic Game Theory
COMP 554	(4)	Approximation Algorithms
COMP 560	(3)	Graph Algorithms and Applications
COMP 566	(3)	Discrete Optimization 1
COMP 567	(3)	Discrete Optimization 2
COMP 610	(4)	Information Structures 1
COMP 627	(4)	Theoretical Programming Languages
COMP 642	(4)	Numerical Estimation Methods
COMP 647	(4)	Advanced Cryptography
COMP 649	(4)	Quantum Cryptography
COMP 690	(4)	Probabilistic Analysis of Algorithms
COMP 760	(4)	Advanced Topics Theory 1
COMP 761	(4)	Advanced Topics Theory 2

## Category B: Systems

COMP 512	(4)	Distributed Systems
COMP 520	(4)	Compiler Design
COMP 529	(4)	Software Architecture
COMP 533	(3)	Model-Driven Software Development
COMP 535	(4)	Computer Networks 1
COMP 575	(3)	Fundamentals of Distributed Algorithms
COMP 612	(4)	Database Programming Principles
COMP 614	(4)	Distributed Data Management
COMP 621	(4)	Program Analysis and Transformations
COMP 655	(4)	Distributed Simulation



COMP 667	(4)	Software Fault Tolerance
COMP 762	(4)	Advanced Topics Programming 1
COMP 763	(4)	Advanced Topics Programming 2
COMP 764	(4)	Advanced Topics Systems 1
COMP 765	(4)	Advanced Topics Systems 2

#### Category C: Applications

COMP 521	(4)	Modern Computer Games
COMP 522	(4)	Modelling and Simulation
COMP 526	(3)	Probabilistic Reasoning and AI
COMP 546	(4)	Computational Perception
COMP 550	(3)	Natural Language Processing
COMP 551	(4)	Applied Machine Learning
COMP 557	(4)	Fundamentals of Computer Graphics
COMP 558	(4)	Fundamentals of Computer Vision
COMP 559	(4)	Fundamentals of Computer Animation
COMP 561	(4)	Computational Biology Methods and Research
COMP 564	(3)	Advanced Computational Biology Methods and Research
COMP 579	(4)	Reinforcement Learning
COMP 618	(3)	Bioinformatics: Functional Genomics
COMP 652	(4)	Machine Learning
COMP 680	(4)	Mining Biological Sequences
COMP 766	(4)	Advanced Topics Applications 1
COMP 767	(4)	Advanced Topics: Applications 2

#### 12.4.8 Doctor of Philosophy (Ph.D.) Computer Science

Required coursework: Students must take eight graduate courses, of which at least five are computer science courses. These courses should be chosen by the student in consultation with the supervisor (or co-supervisor) and the Progress Committee.

##### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

##### Required Courses

COMP 700	(0)	Ph.D. Comprehensive Examination
COMP 701	(3)	Thesis Proposal and Area Examination

##### Complementary Courses

18-24 credits selected from:

##### Category A: Theory and Applications

COMP 523	(3)	Language-based Security
COMP 524	(3)	Theoretical Foundations of Programming Languages

COMP 525	(3)	Formal Verification
COMP 531	(3)	Advanced Theory of Computation
COMP 540	(3)	Matrix Computations
COMP 547	(4)	Cryptography and Data Security
COMP 552	(4)	Combinatorial Optimization
COMP 554	(4)	Approximation Algorithms
COMP 560	(3)	Graph Algorithms and Applications
COMP 561	(4)	Computational Biology Methods and Research
COMP 564	(3)	Advanced Computational Biology Methods and Research
COMP 566	(3)	Discrete Optimization 1
COMP 567	(3)	Discrete Optimization 2
COMP 598	(3)	Topics in Computer Science 1

T

COMP 652	(4)	Machine Learning
COMP 655	(4)	Distributed Simulation
COMP 667	(4)	Software Fault Tolerance
COMP 762	(4)	Advanced Topics Programming 1
COMP 763	(4)	Advanced Topics Programming 2
COMP 764	(4)	Advanced Topics Systems 1
COMP 765	(4)	Advanced Topics Systems 2
COMP 766	(4)	Advanced Topics Applications 1
COMP 767	(4)	Advanced Topics: Applications 2

Note: Each year the Ph.D. Committee will determine which category COMP 598 and COMP 599 belong to according to the subjects taught in those courses.

#### **12.4.9 Doctor of Philosophy (Ph.D.) Computer Science: Bioinformatics**

##### **Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must j/F0 8.3 Tf1 0 0 1 67.52 51(Advpc009ge. It

Telephone: 514-398-6767  
Email: [grad.eps@mcgill.ca](mailto:grad.eps@mcgill.ca)  
Website: [mcgill.ca/eps](http://mcgill.ca/eps)

### 12.5.2 About Earth and Planetary Sciences

The Department of Earth and Planetary Sciences offers both **M.Sc.** and **Ph.D.** degree programs. Graduate programs are based on research, although some courses are required to build the backgrounds of students. Research in the Department is wide-ranging, and includes:

- studies of the geochemistry of the mantle;
- the nature of processes concentrating metals in hydrothermal mineral deposits;
- experimental studies of the controls of viscosity in magmas and the mechanisms of volcanic eruption;
- the fate of carbon and trace metals in marine sediments;
- the nature of changes in atmospheric and oceanic chemistry during Earth's history;
- earthquakes and fault mechanisms;
- geomicrobiology
- wetland hydrogeology;
- interactions between the cryosphere, solid Earth, and climate systems;
- planetary-scale ocean biogeochemistry (e.g., ocean acidification) and its relationship to global warming.

There is a very substantial interdisciplinary basis to much of the research.

Facilities in the Department include low-temperature and pressure to high-temperature and pressure experimental laboratories, a stable-isotope mass spectrometer, laser-ablation ICP-MS, and electron microprobe, as well as atomic absorption spectrometers. Our students also make substantial use of other facilities at McGill and at nearby *Université du Québec à Montréal*.

Financial assistance is available in the form of teaching assistantships, research assistantships, and scholarships.

#### **Areas of Research :**

##### **Aquatic Geochemistry**

Application of chemical thermodynamics, kinetics, and surface chemistry to the characterization of mineral-solution interactions in aquatic environments; carbonate geochemistry; early diagenesis of marine and coastal sediments; trace metal and environmental geochemistry in freshwater and marine systems.

##### **Biogeochemistry**

Response of the marine ecosystem to climate change and anthropogenic stresses through observations of the modern ocean, and experimental and numerical simulations of ocean biogeochemistry. Reconstructions of past climate change using sediments from lacustrine, coastal, and marine sediments. The processes controlling carbon cycling in freshwater environments, including the burial of organic matter in sediments and the production of greenhouse gases through microbial respiration. Development of new isotopic methods for tracing carbon-cycle and hydrological change in the past and present. Investigating the dynamical relationships that link climate, biogeochemical cycles, ecosystems and humans using a combination of large datasets, simple theory and numerical Earth system models to identify novel processes and quantitative relationships.

##### **Economic Geology**

Studies of the genesis of hydrothermal mineral deposits through a combination of field-based, experimental, and theoretical methods. Research focuses on the understanding of physico-chemical controls of mineralization, through geological mapping of deposits; experimental studies of metal solubility and speciation in hydrothermal systems; simulations of hydrothermal alteration; and theoretical studies designed to estimate conditions of alteration and ore formation. Trace-element chemistry of minerals as quantitative probes of the compositions of ore-forming fluids.

##### **Exoplanet Climate**

Using telescopes on the ground and in space to explore the surfaces and atmospheres of the diverse planets outside the Solar System: How much incident stellar flux do planets absorb? How do they move this energy through atmospheric and oceanic circulation? Which planets enjoy habitable surface conditions? Do any of them exhibit atmospheric biosignatures?

##### **Geobiology**

Understanding the role of microorganisms in biogeochemical cycles; cultivation of environmental microorganisms; applying molecular and isotopic tools to characterize microbial activity in present and past environments.

##### **Geophysics and Climate**

Applying physics to study the interactions between the solid Earth, ice, ocean, and climate systems; numerical modelling, analysis, and interpretation of paleo and modern sea-level changes, solid earth deformation and glacial isostatic adjustment, and ice in the Earth and climate systems.

##### **Hydrogeology**

Studies of pore-water flow in northern peatlands; heat transport; heat as a tracer of natural systems; groundwater modelling; coupled numerical models of pore water flow and heat transport with freeze/thaw processes; and the impact of melting tropical glaciers on water resources.

##### **Igneous Petrology**

Experimental studies of the structure, thermodynamics, and transport properties (dif

English proficiency is required prior to admission. For a list of acceptable test scores and minimum requirements, visit [mcgill.ca/CHO](http://mcgill.ca/CHO)

**Associate Professors**

Nicolas Cowan; B.Sc.(McG.), Ph.D.(Wash.) (*joint appt. with Physics*)

Yajing Liu; B.Sc.(Peking), Ph.D.(Harv.)

Jeanne Paquette; B.Sc., M.Sc.(McG.), Ph.D.(SUNY, Stony Brook)

Christie Rowe; A.B.(Smith), Ph.D.(Calif.-Santa Cruz) (*Robert Wares Faculty Scholar*)

Vincent van Hinsberg; Propadeuse, Doctorandus(Utrecht), Ph.D.(Brist.) (*Osisko Faculty Scholar*)

**Assistant Professors**

Kim Berlo; Propadeuse, Doctorandus(Utrecht), Ph.D.(Brist.)

Peter Douglas; B.Sc.(Pomona), Ph.D.(Yale)

Natalya Gomez; B.Sc., M.Sc.(Tor.), Ph.D.(Harv.)

James Kirkpatrick; B.Sc., M.Sc.(Leeds), Ph.D.(Glas.)

Nagissa Mahmoudi; B.Sc.(Tor.), Ph.D.(McM.)

**Faculty Lecturer**

W. Minarik; B.A.(St. Olaf), M.Sc.(Wash.), Ph.D.(Rensselaer Poly.)

**Adjunct Professors**

R. Harrington; B.Sc., M.S., Ph.D.( Calif.-LA), R. Léveillé; B.Sc., Ph.D., D.Phil.(UIB), H. Short; B.A. (Skidmore), M.Sc. (Albany), Ph.D. (Maine)

**12.5.5 Master of Science (M.Sc.) Earth and Planetary Sciences (Thesis) (45 credits)****Thesis Courses (33 credits)**

EPSC 697	(9)	Thesis Preparation 1
EPSC 698	(12)	Thesis Preparation 2
EPSC 699	(12)	Thesis Preparation 3

**Complementary Courses (12 credits)**

Four 3-credit 500-, 600-, or 700-level EPSC courses chosen with the approval of the supervisor or the research director and GPS.

**12.5.6 Doctor of Philosophy (Ph.D.) Earth and Planetary Sciences**

Highly qualified B.Sc. graduates may be admitted directly to the Ph.D. 1 year. Students with the M.Sc. degree are normally admitted to the Ph.D. 2 year.

\* Students are required to take four graduate-level courses in the Ph.D. 1 year, and two courses plus a comprehensive oral examination in the Ph.D. 2 year.

**Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

**Required Courses**

EPSC 700	(0)	Preliminary Doctoral Examination
----------	-----	----------------------------------

**Complementary Courses**

Two to six courses (6 to 18 credits) approved at the 500, 600, or 700 level selected in consultation with the student's supervisor and approved by the Academic Standing Committee.

---

## 12.6 Geography

### 12.6.1 Location

Department of Geography  
Burnside Hall  
805 Sherbrooke Street West, Room 705  
Montreal QC H3A 0B9  
Canada  
Telephone: 514-398-4111  
Fax: 514-398-7437  
Email: [grad.geog@mcgill.ca](mailto:grad.geog@mcgill.ca)  
Website: [mcgill.ca/geography](http://mcgill.ca/geography)

### 12.6.2 About Geography

The Department of Geography offers research and thesis-based graduate programs leading to a **Master of Arts (M.A.)**, a **Master of Science (M.Sc.)**, or a **Doctorate (Ph.D.)**. In its scope, our program includes the opportunity to conduct field-based studies in both the natural (i.e., biophysical) and the social sciences. Thematic areas of study include:

- Political, Urban, Economic, and Health Geography
- Environment and Development
- Geographic Information Systems and Remote Sensing
- Land Surface Processes



*: Master of Arts (M.A.) Geography (Thesis): Development Studies (45 credits)*

The Development Studies Option (DSO) is cross-disciplinary in scope within existing master's programs in Geography, Anthropology, History, Political Science, Economics, and Sociology

### ***: Doctor of Philosophy (Ph.D.) Geography***

The doctoral degree in Geography includes the successful completion of the comprehensive examination, a thesis based on original research, and coursework chosen in collaboration with the student's supervisor and/or research committee. The main elements of the Ph.D. are the thesis and comprehensive examination, a required Methods of Geographical Research course, and a minimum of two complementary courses.

### ***: Doctor of Philosophy (Ph.D.) Geography: Environment***

The Environment option consists of the thesis and comprehensive examination; required courses from Geography and Environment; and complementary courses in Environment or other fields recommended by the research committee and approved by the Environment Option Committee. The graduate option in Environment provides students with an appreciation for the role of science in informed decision-making in the environmental sector, and its influence on political, socio-economic, and ethical judgments. Students who have been admitted through their home department or faculty may apply for admission to the option. Option requirements are consistent across academic units. The option is coordinated by the *Bieler School of Environment*, in partnership with participating academic units.

### ***: Doctor of Philosophy (Ph.D.) Geography: Gender and Women's Studies***

This doctoral option is an interdisciplinary program for students who meet the degree requirements in Geography and who wish to earn 9 credits of approved coursework on gender and women's studies and issues in feminist research and methods. It includes a thesis centrally related to gender and/or women's studies; the comprehensive examination; required courses in Geography and Women's Studies; and complementary courses, one of which must pertain to gender and/or women's issues.

### ***: Doctor of Philosophy (Ph.D.) Geography: Neotropical Environment***

The McGill-STRI Neotropical Environment Option (NEO) is a research-based option for Ph.D. students offered in association with several university departments, the *Bieler School of Environment*, and the *Smithsonian Tropical Research Institute* (STRI-Panama) and includes the thesis; comprehensive examination; required courses in Geography, Environment, and Biology; and complementary courses chosen from Geography, Agriculture Sciences, Biology, Sociology, Environment, and Political Science. NEO is aimed at students who wish to focus their graduate research on environmental issues relevant to the Neotropics and Latin American countries. NEO favours interdisciplinary approaches to research and learning through the participation of researchers from McGill and from STRI. Students will complete their research in Latin America and NEO's core and complementary courses will be taught in Panama. NEO's educational approach seeks to facilitate a broader understanding of tropical environmental issues and the development of skills relevant to working in the tropics.

## **12.6.3 Geography Admission Requirements and Application Procedures**

### **12.6.3.1 Admission Requirements**

#### **M.A. and M.Sc. Degrees**

Applicants not satisfying the conditions in *University Regulations & Resources > Graduate > Graduate Admissions and Application Procedures*, but with primary undergraduate specialization in a cognate field, may be admitted to the M.A. or M.Sc. degree in Geography in certain circumstances. In general, they, and others who have deficiencies in their preparation but are otherwise judged to be acceptable, will be required to register for a Qualifying program or to undertake additional courses.

#### **Ph.D. Degree**

Students who have completed a master's degree in Geography or a related discipline (with high standing)

### **12.6.3.2.1 Additional Requirements**

The items and clarifications below

**Associate Professors**

K. Manaugh;B.A.(Naropa), M.U.P

ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3
GEOG 631	(3)	Methods of Geographical Research

### **Complementary Courses (12 credits)**

9 credits of courses at the 500 level or higher selected according to guidelines of the Department. GEOG 696 can count among these complementary credits for students with an appropriate background.

3 credits, one course chosen from the following:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or another course at the 500 level or higher recommended by the Advisory Committee and approved by the Environment Option Committee.

## **12.6.7 Master of Science (M.Sc.) Geography (Thesis): Neotropical Environment (45 credits)**

Participation in the MSE-Panama Symposium presentation in Montreal is also required.

### **Thesis Courses (30 credits)**

GEOG 698	(6)	Thesis Proposal
GEOG 699	(24)	Thesis Research

### **Required Courses (9 credits)**

BIOL 640	(3)	Tropical Biology and Conservation
ENVR 610	(3)	Foundations of Environmental Policy
GEOG 631	(3)	Methods of Geographical Research

### **Complementary Course (3 credits)**

3 credits, one Geography graduate course. GEOG 696 can count among these complementary credits for students with an appropriate background.

### **Elective Course (3 credits)**

3 credits, at the 500 level or higher, on environmental issues to be chosen in consultation with and approval by the student's supervisor AND the Neotropical Environment Options Director.

## **12.6.8 Doctor of Philosophy (Ph.D.) Geography**

The doctoral degree in Geograph

The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### **Required Courses**

GEOG 631	(3)	Methods of Geographical Research
GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3

#### **Complementary Courses**

Two courses at the 500, 600, or 700 level selected according to guidelines of the Department.

### **12.6.9 Doctor of Philosophy (Ph.D.) Geography: Environment**

The Ph.D. in Geography Environment is a research program offered in collaboration with the Bieler School of Environment. As a complement to the unit's expertise, the program considers how various dimensions (scientific, social, legal, ethical) interact to define environment and sustainability issues.

#### **Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### **Required Courses (6 credits)**

ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability
GEOG 631	(3)	Methods of Geographical Research
GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3

#### **Complementary Courses (9 credits)**

3-6 credits chosen from:

(3)	Foundations of Environmental Policy
-----	-------------------------------------

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

### Required Courses

GEOG 631	(3)	Methods of Geographical Research
GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3
WMST 601	(3)	Feminist Theories and Methods
WMST 602	(3)	Feminist Research Symposium

### Complementary Courses

Two substantive courses.

One of these two courses must be taken within the Department of Geography at the 500 level or above; one of the two courses must be on gender/women's issues at the 500, 600, or 700 level.

## 12.6.11 Doctor of Philosophy (Ph.D.) Geography: Neotropical Environment

The Neotropical Option is offered in association with several University departments, the Bieler School of Environment, and the Smithsonian Tropical Research Institute (STRI-Panama) and includes the thesis, comprehensive examination, required courses (9 credits) in Geography, Environment and Biology, and complementary courses (3 credits) chosen from Geography, Agriculture Sciences, Biology, Sociology, Environment, and Political Science.

Participation in the MSE-Panama Symposium presentation in Montreal is also required.

### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

### Required Courses

BIOL 640	(3)	Tropical Biology and Conservation
ENVR 610	(3)	Foundations of Environmental Policy
GEOG 631	(3)	Methods of Geographical Research
GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3

### Elective Courses

3 credits, at the 500 level or higher, on environmental issues to be chosen in consultation with and approved by the student's supervisor AND the Neotropical Environment Options Director.

## 12.7 Mathematics and Statistics

### 12.7.1 Location

Department of Mathematics and Statistics  
Burnside Hall, Room 1005  
805 Sherbrooke Street West

Montreal QC H3A 0B9  
Canada  
Telephone: 514-398-3800  
Fax: 514-398-3899  
Email: [grad.mathstat@mcgill.ca](mailto:grad.mathstat@mcgill.ca)  
Website: [mcgill.ca/mathstat/](http://mcgill.ca/mathstat/)

### 12.7.2 About Mathematics and Statistics

The Department of Mathematics and Statistics offers programs that can be focused on applied mathematics, pure mathematics, and statistics leading to master's degrees (**M.A.** or **M.Sc.**), with program options in Bioinformatics. The research groups are:

- Algebra;
- Algebraic Geometry;
- Analysis;
- Applied Mathematics;
- Differential Equations;
- Differential Geometry;
- Discrete Mathematics;
- Geometric Group Theory;
- Logic;
- Mathematical Biology;
- Mathematical Physics;
- Number Theory;
- Probability;
- Statistics.

In the basic master's programs, students must choose between the thesis option, and the non-thesis option which requires a project. The Bioinformatics option requires a thesis. In addition to the Ph.D. program in Mathematics and Statistics, there is a Ph.D. option in Bioinformatics.

The *Department's website* provides extensive information on the Department and its facilities, including the research activities and research interests of individual f





- Personal Statement – In the personal statement, the applicants should clearly explain their choice of preferred research group(s) and preferred area(s) of research, as well as providing relevant information that will not be reflected on their transcripts
- Research Proposal (optional) – If applicants have a specific research problem of interest that they want to pursue, they may discuss the details in the research proposal
- Applicants in pure and applied mathematics should provide a GRE score report, if available

For more details, please consult [mcgill.ca/mathstat/postgraduate/prospective-students/admissions](http://mcgill.ca/mathstat/postgraduate/prospective-students/admissions).

### 12.7.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Mathematics and Statistics and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at [mcgill.ca/gps/contact/graduate-program](http://mcgill.ca/gps/contact/graduate-program).

Application Opening Dates	Application Deadlines
---------------------------	-----------------------

**Current McGill Students (anyA**

### Emeritus Professors

John C. Taylor; B.Sc.(Acad.), M.A.(Qu.), Ph.D.(McM.)

Jian-Jun Xu; B.Sc., M.Sc.(Beijing), M.Sc., Ph.D.(Rensselaer Poly.)

Sanjo Zlobec; M.Sc.(Zagreb), Ph.D.(N'western)

### Professors

Masoud Asgharian; B.Sc.(SBU, Iran), M.Sc., Ph.D.(McG.)

Peter Bartello; B.Sc.(Tor.), M.Sc., Ph.D.(McG.) (*joint appt. with Atmospheric and Oceanic Sciences*)

Rustum Choksi; B.Sc.(Tor.), M.Sc., Ph.D.(Brown)

Henri Darmon; B.Sc.(McG.), Ph.D.(Harv.), F.R.S.C. (*Distinguished James McGill Professor*)

Christian Genest; B.Sp.Sc.(UQAC), M.Sc.(Montr.), Ph.D.(Br. Col.) (*Canada Research Chair*)

Eyal Z. Goren; B.A., M.S., Ph.D.(Hebrew)

Pengfei Guan; B.Sc.(Zhejiang), M.Sc., Ph.D.(Princ.) (*Distinguished James McGill Professor*)

Jacques C. Hurtubise; B.Sc.(Montr.), D.Phil.(Oxf.) F.R.S.C.

Dmitry Jakobson; B.Sc.(MIT), Ph.D.(Princ.) (*Peter Redpath Professor*)

Vojkan Jaksic; B.S.(Belgrade), Ph.D.(Caltech.)

Niky Kamran; B.Sc., M.Sc.(ULB), Ph.D.(Wat.), F.R.S.C. (*James McGill Professor*)

Johanna Neslehova; B.Sc., M.Sc.(Hamburg), Ph.D.(Oldenburg)

Adam Oberman; B.S.(Tor.), M.S., Ph.D.(Chic.)

Charles Roth; M.Sc.(McG.), Ph.D.(Hebrew)

David A. Stephens; B.Sc., Ph.D.(Nott.)

Valentino Tosatti; M.A., Ph.D. (Harv.)

John A. Toth; B.Sc., M.Sc.(McM.), Ph.D.(MIT)

Adrian Vetta; B.Sc., M.Sc.(LSE), Ph.D.(MIT) (*joint appt. with Computer Science*)

Daniel T. Wise; B.A.(Yeshiva), Ph.D.(Princ.) (*James McGill Professor*)

David Wolfson; B.Sc., M.Sc.(Natal), Ph.D.(Purd.)

### Associate Professors

Louigi Addario-Berry; B.Sc., M.Sc., Ph.D.(McG.)

Antony R. Humphries; B.A., M.A.(Camb.), Ph.D.(Bath)

Abbas Khalili; B.S., M.S.(IUT, Iran), Ph.D.(Wat.)

Jean-Philippe Lessard; B.Sc.(Sher.), M.Sc.(Montr.), Ph.D.(Georgia Tech.)

Jean-Christophe Nave; B.Sc., Ph.D.(Calif., Santa Barbara)

Ser6T7(Hebre)

**Assistant Professors**

Tim Hoheisel; Dipl., Ph.D.(Wurzburg)  
 Jessica Lin; B.A.(NYU), Ph.D.(Chic.)(*Canada Research Chair*)  
 Michael Lipnowski; B.Sc.(Wat.), Ph.D.(Stan.)  
 Courtney Paquette; Ph.D (Wash.)  
 Elliot Paquette; Ph.D (Wash.)  
 Brent Pym; B.Sc.E.(Qu.), M.Sc., Ph.D.(Tor.)  
 Anush Tserunyan; B.S., M.S. (YSMU), Ph.D (Calif., Los Angeles)  
 Yi Yang; B.S.(Sichuan), M.S., Ph.D.(Minn.)

**Associate Members**

Xiao-Wen Chang (*Computer Science*)  
 Pierre R.L. Dutilleul (*Plant Science*)  
 Leon Glass (*Physiology*)  
 James A. Hanley (*Epidemiology and Biostatistics*)  
 Hamed Hatami (*Computer Science*)  
 Anmar Khadra (*Physiology*)  
 Xue Liu (*Computer Science*)  
 Michael Mackey (*Physiology*)  
 Erica E.M. Moodie (*Epidemiology and Biostatistics*)  
 Prakash Panangaden (*Computer Science*)  
 Robert W. Platt (*Epidemiology and Biostatistics*)  
 James O. Ramsay (*Psychology*)  
 Alexandra Schmidt (*Epidemiology and Biostatistics*)  
 Kaleem Siddiqi (*Computer Science*)  
 Christina Wolfson (*Epidemiology and Biostatistics*)

**Adjunct Professors**

Renato C. Calleja; B.S.(ITAM), Ph.D.(Texas-Austin)  
 Eliot Freid; B.S.(Cal Poly), M.S., Ph.D.(Calif. Tech.)  
 Andrew Granville; B.A., CASM(Camb.), Ph.D.(Qu.)  
 Adrian Iovita; B.S.(Bucharest), Ph.D.(Boston)  
 Dimitris Koukouloupoulos; M.Sc., Ph.D.(Ill.-Chic.)  
 Xin Yang Lu; B.Sc., M.Sc., Ph.D.(Pisa)  
 Etienne Marceau; B.Sc., M.Sc.(Laval); Ph.D.(Louvain)  
 Ming Mei; B.Sc., M.Sc.(JXNU), Ph.D.(Kanazawa)  
 M. Ram Murty; B.Sc.(Car.), Ph.D.(MIT), F.R.S.C.  
 Claude-Alain Pillet; M.Sc., Ph.D.(ETH Zurich)  
 Iosif Polterovich; M.Sc.(Moscow St.), Ph.D.(Weizmann Inst.)  
 Maksym Radziwill; B.Sc.(McG.), Ph.D.(Stan.)  
 Robert A.G. Seely; B.Sc.(McG.), Ph.D.(Camb.)  
 F. Bruce Shepherd; B.Sc.(Vic., Tor.), M.Sc., Ph.D.(Wat.)  
 Armen Shirikyan; M.Sc., Ph.D.(Moscow St.); Habilitation(Paris-Sud XI)  
 Pedro A. Valdes-Sosa; B.Sc.(Havana), Ph.D.(National Center for Scientific Research, Cuba)



### **Complementary Courses (21 credits)**

Minimum 21 credits of approved graduate courses, with at least two courses at the 600-level or above.

## **12.7.8 Doctor of Philosophy (Ph.D.) Mathematics and Statistics: Bioinformatics**

### **Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

### **Required Courses (3 credits)**

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
		Ph.D. Comprehensive Examination P0ts)

The Department offers full **M.Sc.** and **Ph.D.** degree programs in a wide range of disciplines, including:

- astrophysics;
- atmospheric physics;
- bio-physics;
- condensed-matter physics;
- high-energy physics;
- laser spectroscopy;
- material physics;
- non-linear dynamics and atmospheric physics;
- nuclear physics;
- statistical physics;
- medical-radiation physics.

Although most of the teaching and research facilities are located in the Ernest Rutherford Physics Building, the Department has space and research facilities in the Wong Materials Science Centre, adjacent to the Rutherford Building. Our groups also conduct research at the [McGill University Health Centre](#) (MUHC), the [Jewish General Hospital](#), the [Montreal Neurological Institute](#) (MNI) and laboratories around the world, including [Argonne](#), [CERN](#), [FermiLab](#), [SLAC](#), [TRIUMF](#), and [KEK](#).

Departmental researchers enjoy technical support in the areas of engineering, electronics, and precision machining. The Department maintains an excellent conventional machine shop as well as the McGill Nanotools-Microfab facility. Most of the scientific computing is done with an extensive in-house network of powerful workstations and several Beowulf clusters.

Remote access to supercomputing sites in Canada and the United States is also possible including the McGill HPC super-computing facility which is a part of the nationwide network of high performance computing installations in Quebec.

The Department of Physics offers a competitiv

- The study of ground state properties of unstable nuclei using laser spectroscopy techniques and ion traps. This work is being carried out using the Canadian Penning trap facility at the [Argonne National Laboratory](#), at the accelerator ISOLDE ([CERN](#)), and the ISAC facility at [TRIUMF](#).

Furthermore, the Nuclear Physics Group has an active in-house research program that applies the ion trap and laser techniques to the detection of trace quantities of material and contaminants, and to ion spectroscopy.

#### Condensed Matter Physics and Biophysics

*Theoretical:* Current research programs involve the nonequilibrium, ab-initio modelling of molecular and nanoelectronic systems and devices; the study of quantum effects in interacting mesoscopic electron systems; nonequilibrium phenomena in extended systems; and applications of statistical mechanics to problems in biophysics.

*Experimental:* Current research programs involve:

- the study of the time evolution of non-equilibrium systems via x-ray diffraction;
- fundamental quantum properties of strongly correlated systems at temperatures very near absolute zero;
- macromolecular interactions in living cells using single-photon and two-photon imaging;
- molecular electronics and nanoelectronic systems by scanning probe microscopy;
- dynamics and mechanical properties of soft matter systems and spatial organization and dynamics in living cells;
- mechanical behaviour of very small systems by high-resolution force microscopy;
- electronic properties that emerge at the limits of miniaturization and quantum computing;
- nuclear methods to study interactions in magnetic materials that lead to exotic magnetic ordering behaviour. This includes studies of novel materials such as carbon nanotubes, graphene, unconventional superconductors, quantum dots, heterostructures, amorphous systems, and spin glasses.

#### Astrophysics

Research in the astrophysics group covers a wide range of topics including cosmology, galaxy formation, high-energy astrophysics, and extrasolar planets. This involves observations at all wavelengths, from gamma rays and X-rays to sub-mm, infrared, and radio, using international observatories in space and on the ground. Experimental groups at McGill are involved in development and operation of ground-based high-energy gamma-ray observatories, and cosmic microwave background experiments. Theoretical work includes studies of how astrophysics and observational cosmology can experimentally determine the most important properties of dark matter and dark energy, studies of the diverse physics of neutron stars, and extrasolar planet formation.

#### Nonlinear Variability and Atmospheric Physics

This group studies nonlinear dynamical processes in the atmosphere and other geophysical systems, especially those associated with turbulent, chaotic, and extremely variable behaviour. Emphasis is placed on multifractal analysis and modelling as well as the development of new theories and techniques covering wide ranges of scale in time and space. Data from a variety of in situ and remotely sensed sources are used. This includes satellite data of the Earth's atmosphere and surface as well as high-quality precipitation data from the [McGill Radar Weather Observatory](#).

#### Medical Radiation Physics

The Medical Physics Unit is a teaching and research unit concerned with the application of physics and related sciences in medicine, especially (but not exclusively) in radiation medicine; i.e., radiation oncology, medical imaging, and nuclear medicine. The Unit's facilities are available for students to undertake a Ph.D. in Physics administered through the Department of Physics with a research emphasis on medical physics supervised, funded, and hosted by Medical Physics Unit PIs (principal investigators).

The research interests of Unit members include various aspects of medical imaging, including:

- 3D imaging;
- the development of new imaging modalities;
- applications of imaging in radiation therapy such as radiation dosimetry and solid state;
- nuclear cardiology; and
- applications of radiation biology to therapy.

#### *section 12.8.5: Master of Science (M.Sc.) Physics (Thesis) (45 credits)*

This program provides a comprehensive introduction to the academic, research, and practical aspects of physics. The primary goal of this program is to provide students with unique opportunities to learn fundamental research techniques in experimental and/or theoretical research, and objectively synthesize information from scientific literature. Each M.Sc. student chooses their preferred major research area and research supervisor. Thesis work is available in a broad range of sub-disciplines (see [departmental website](#) for details). Students wishing to continue to our doctoral program have the option, with supervisor approval, of transferring directly to the Ph.D., waiving the M.Sc. thesis submission.

#### *section 12.8.6: Doctor of Philosophy (Ph.D.) Physics*

The doctoral program provides all the tools required for a competitive career in academic settings, as well as in industry or other fields. The multidisciplinary nature of the Department exposes students to a vast array of research interests and experimental or theoretical approaches. Graduate research activities leading to the presentation of a Ph.D. thesis involve original work, with distinct contributions to knowledge. Our graduate program offers training in a unique and multidisciplinary environment in Canada's top university and may involve an extended stay at one of the world's major research laboratories.



## 12.8.3 Physics Admission Requirements and Application Procedures

### 12.8.3.1 Admission Requirements

#### M.Sc.

We normally require a background that is equivalent to our : [Bachelor of Science \(B.Sc.\) - Major Physics \(63 credits\)](#).

#### Ph.D.

The normal requirement is an M.Sc. in Physics or equivalent, but exceptional students may be considered for direct entry to the Ph.D. program. On the recommendation of the Departmental Graduate Committee, fast-tracking from the M.Sc. program into the Ph.D. program may be granted after one year, if:

- the student has fulfilled the M.Sc. coursework requirements, or;
- the Committee determines that the student qualifies based on the student's academic record.

All students who transfer to the Ph.D. program are required to fulfil Ph.D. coursework requirements in addition to the courses taken as an M.Sc. candidate.

### 12.8.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at [mcgill.ca/gradapplicants/apply](http://mcgill.ca/gradapplicants/apply).

See [University Regulations & Resources](#) > [Graduate](#) > [Graduate Admissions and Application Procedures](#) > : [Application Procedures](#) for detailed application procedures.

#### Financial Assistance

Financial assistance will be offered to all students at the time of acceptance, if applicable. For more information, please visit our finance page: [physics.mcgill.ca/grads/finance.html](http://physics.mcgill.ca/grads/finance.html).

### 12.8.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- 2 Letters of Reference
- Physics CV
- Personal Statement
- Thesis Abstract or Summary – optional
- [GRE](#) – recommended but not required

A list of supporting documentation required by the University can be found at [mcgill.ca/gradapplicants/apply/prepare/checklist/documents](http://mcgill.ca/gradapplicants/apply/prepare/checklist/documents). International students must also demonstrate proficiency in English. Details are available at [mcgill.ca/gradapplicants/international/apply/proficiency](http://mcgill.ca/gradapplicants/international/apply/proficiency).

### 12.8.3.3 Application Dates and Deadlines

**Director of Graduate Studies**

A. Cumming

**Emeritus Professors**

J. Barrette; M.Sc., Ph.D.(Montr.)

S. Das Gupta; B.Sc., M.Sc.(Calc.), Ph.D.(McM.) (*Macdonald Emeritus Professor of Physics*)

N.B. de Takacsy; B.Sc., M.Sc.(Montr.), Ph.D.(McG.)

R. Harris; B.A.(Oxf.), Ph.D.(Sus.)

C.S. Lam; B.Sc.(McG.), Ph.D.(MIT)

D.G. Stairs; B.Sc., M.Sc.(Qu.), Ph.D.(Harv.) (*Macdonald Emeritus Professor of Physics*)

J.O. Ström-Olsen; B.A., M.S., Ph.D.(Camb.)

M. Sutton; B.Sc., M.Sc., Ph.D.(Tor.) (*James McGill Professor*) (*Rutherford Professor*)

M.J. Zuckermann; M.A., D.Phil.(Oxf.), F.R.S.C.

**Post-Retirement Professors**

Z. Altounian; Ph.D.(McM.)

F. Buchinger; Ph.D.(JGU, Mainz)

**Professors**R. Brandenberger; Dip.(ETH Zurich), A.M., Ph.D.(Harv.) (*Canada Research Chair*)

J. Cline; B.S.(Harvey Mudd), M.Sc., Ph.D.(Caltech)

F. Coriveau; B.Sc.(Laval), M.Sc.(Br. Col.), Ph.D.(ETH Zurich) (*Affiliated I.P.P. Scientist*)

M. Dobbs; B.Sc.(McG.), Ph.D.(Vic., BC)

C. Gale; B.Sc.(Ott.), M.Sc., Ph.D.(McG.) (*James McGill Professor*)

G. Gervais; B.Sc.(Sher.), M.Sc.(McM.), Ph.D.(N'western)

M. Grant; B.Sc.(PEI), M.Sc., Ph.D.(Tor.), F.R.S.C. (*James McGill Professor*)P. Grütter; Dip., Ph.D.(Basel), F.R.S.C. (*James McGill Professor*)H. Guo; B.Sc.(Sichuan), M.Sc., Ph.D.(Pitt.), F.R.S.C. (*James McGill Professor*)D. Hanna; B.Sc.(McG.), A.M., Ph.D.(Harv.) (*Macdonald Professor of Physics*)

S. Jeon; B.Sc.(SNU, S. Korea), M.Sc., Ph.D.(Wash.)

V. Kaspi; B.Sc.(McG.), M.A., Ph.D.(Princ.), F.R.S.C. (*Canada Research Chair*) (*Lorne Trottier Chair in Astrophysics and Cosmology*)

S. Lovejoy; B.A., M.A.(Camb.), Ph.D.(McG.)

A. Maloney; B.S., M.S.(Stan.), Ph.D.(Harv.)

N. Provas; Ph.D.(McG.) (*Canada Research Chair*)K. Ragan; B.Sc.(Alta.), Ph.D.(Geneva) (*Macdonald Professor of Physics*)

D.H. Ryan; B.A., Ph.D.(Dub.)

P. Wiseman; B.Sc.(St. FX), Ph.D.(UWO) (*joint appt. with Chemistry*)**Associate Professors**

T. Brunner; Dip., Ph.D.(TUM)

H. Cynthia Chiang; B.Sc.(Ill.-Urbana-Champaign), Ph.D.(Caltech)

L. Childress; B.A., Ph.D.(Harv.) (*Canada Research Chair*)

B. Coish; B.Sc.(Manit.), M.Sc.(McM.), Ph.D.(Basel)

D. Cooke; B.Sc.(St. FX), Ph.D.(Alta.)

N. Cowan; B.Sc.(McG.), Ph.D.(Wash.) (*joint appt. with Earth and Planetary Sciences*)

### Associate Professors

A. Cumming; B.A.(Camb.), Ph.D.(Calif., Berk.)  
K. Dasgupta; M.Sc.(IIT Delhi), Ph.D.(TIFR, India)  
P. Francois; Ph.D.(Paris VII)  
D. Haggard; B.A.(St. John's), M.Sc.(SF State), Ph.D.(Wash.)  
M. Hilke; B.Sc., M.Sc., Ph.D.(Geneva)  
T. Pereg-Barnea; B.Sc.(Jerus.), M.Sc, Ph.D.(Br. Col.)  
W. Reisner; B.A.(Reed), Ph.D.(Princ.)  
S. Robertson; B.Sc.(Calg.), M.Sc., Ph.D.(Vic., BC) (*Affiliated I.P.P. Scientist*)  
R. Rutledge; B.Sc.(USC), Ph.D.(MIT)  
J. Sankey; Ph.D.(Cornell) (*Canada Research Chair*)  
J. Sievers; Ph.D.(Caltech)  
B. Siwick; B.A.Sc., M.Sc., Ph.D.(Tor.) (*Canada Research Chair*) (*joint appt. with Chemistry*)  
B. Vachon; B.Sc.(McG.), Ph.D.(Vic., BC)  
A. Warburton; B.Sc.(Vic., BC), M.Sc., Ph.D.(Tor.)  
T. Webb; B.Sc.(Tor.), M.Sc.(McM.), Ph.D.(Tor.)

### Assistant Professors

K. Agarwal; B.Tech(IIT Kanpur), Ph.D.(Harv.)  
S. Caron-Huot; B.Sc.(Laval), M.Sc., Ph.D.(McG.)  
E. Lee; B.Sc., M.Sc.(Tor.), M.A., Ph.D.(Calif., Berk.)  
A. Liu; B.A.(Princ.), Ph.D.(MIT)TMIUCBerk.j1 0 0 1 208.185 560.441 112.4elej1 0 0 1 210.8848160.441 112.4y

**12.8.5 Master of Science (M.Sc.) Physics (Thesis) (45 credits)****Thesis Courses (30 credits)**

PHYS 690	(24)	M.Sc. Thesis
PHYS 692	(6)	Thesis Project

**Complementary Courses (15 credits)**

12 credits at the 500, 600, or 700 level.

3 credits at the 600 or 700 level:

Students with an appropriate background may request Departmental permission to substitute up to 6 credits chosen from the following courses:

PHYS 691	(3)	Thesis Preparation
PHYS 693	(3)	M.Sc. Research

Students must also successfully complete all the other normal requirements of Graduate and Postdoctoral Studies.

**12.8.6 Doctor of Philosophy (Ph.D.) Physics****Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

**Required Courses**

Candidates must successfully complete two 3-credit graduate courses at the 600 level or above; one of these courses should be in the candidate's area of specialization. If the candidate completed two or more courses at the 600 level as part of the McGill Physics M.Sc. program, then one of these courses may be used as a substitute for one of the required courses. In all cases, candidates must also pass the Ph.D. preliminary examination (PHYS 700).

PHYS 700	(0)	Preliminary Ph.D. Examination
----------	-----	-------------------------------

---

**12.9 Psychology****12.9.1 Location**

Department of Psychology  
2001 McGill College Avenue, 7th Floor  
Montreal QC H3A 1G1  
Canada  
Telephone: 514-398-6127/514-398-6100  
Fax: 514-398-4896  
Email: [chantale.bousquet@mcgill.ca](mailto:chantale.bousquet@mcgill.ca)  
Website: [mcgill.ca/psychology](http://mcgill.ca/psychology)

**12.9.2 About Psychology**

The aim of the Experimental program is to provide students with an environment in which they are free to develop skills and expertise that will serve during a professional career of teaching and research as a psychologist. Coursework and other requirements are at a minimum. Success in the program depends on the student's ability to organize unscheduled time for self education. Continuous involvement in research planning and execution is considered a very important component of the student's activities. Students are normally expected to do both master's and doctoral study.

**M.A.** and **M.Sc.** degrees may be awarded in Experimental Psychology, but only as a step to the **Ph.D.**—students undergo formal evaluation beginning with the submission of their master's requirements (thesis or fast-track paper) to enter Ph.D. 2.

The Clinical program adheres to the scientist practitioner model and as such is designed to train students for careers in university teaching or clinical research, and for service careers (working with children or adults in hospital, clinical, or educational settings). Most of our clinical graduates combine service and research roles. While there are necessarily many more course requirements than in the Experimental program, the emphasis is again on research training. There is no master's program in Clinical Psychology; the Department offers direct entry to a doctoral degree for holders of an undergraduate degree, and students are expected to complete the full program leading to a doctoral degree.

Research interests of members of the Psychology Department include:

- behavioural neuroscience;
- clinical psychology;
- cognition & cognitive neuroscience;
- developmental science;
- health psychology;
- quantitative psychology & modelling;
- social & personality psychology.

Facilities for advanced research in a variety of fields are available within the Department itself. In addition, arrangements exist with the Departments of Psychology at the Montreal Neurological Institute and Hospital, Allan Memorial Institute, Douglas Mental Health University Institute, Jewish General Hospital, Montreal Children's Hospital, and Montreal General Hospital to permit graduate students to undertake research in a hospital setting.



**Note:** Many MUHC-affiliated hospitals and institutes are now located at the Glen site; further information is available on the [MUHC website](#).

For inquiries about all programs and financial aid, and for application forms, contact the [Graduate Program Administrator](#)

#### **Ph.D. Option in Behavioural Neuroscience**

Information about this option is available from the Department and at [mcgill.ca/psychology/graduate/program-tracksTm\(am-tr\)Tj1 0 0 1 432.412 431.5960 0s5 Tm\(am \)](http://mcgill.ca/psychology/graduate/program-tracksTm(am-tr)Tj1 0 0 1 432.412 431.5960 0s5 Tm(am ))

### *section 12.9.8: Doctor of Philosophy (Ph.D.) Psychology: Language Acquisition*

This unique interdisciplinary program focuses on the scientific exploration of language acquisition by different kinds of learners in diverse contexts. Students in the Language Acquisition program are introduced to theoretical and methodological issues on language acquisition from the perspectives of cognitive neuroscience, theoretical linguistics, psycholinguistics, education, communication sciences and disorders, and neuropsychology.

### *section 12.9.9: Doctor of Philosophy (Ph.D.) Psychology: Psychosocial Oncology*

The Department of Oncology, in conjunction with the Ingram School of Nursing, the Department of Psychology, and the School of Social Work, has developed the cross-disciplinary Psychosocial Oncology Option (PSOO). This option is open to doctoral students in the Ingram School of Nursing and in the Department of Psychology who are interested in broadening their knowledge of psychosocial issues in oncology.

## 12.9.3 Psychology Admission Requirements and Application Procedures

### 12.9.3.1 Admission Requirements

Admission to the graduate program depends on an evaluation of students' research interests and their aptitude for original contributions to knowledge and, if applicable, for professional contributions in the applied field.

The usual requirement for admission is an Honours or majors degree (B.A. or B.Sc.) in Psychology. This usually includes an introductory course plus twelve courses in psychology (each equivalent to three term hours). Courses in experimental psychology, the theoretical development of modern ideas in psychology, and statistical methods as applied to psychological problems (equivalent to an introductory course) are essential. Applicants' knowledge of relevant biological, physical, and social sciences is considered. Students applying to the clinical program are advised to complete 42 specific undergraduate credits in psychology as specified by the *Order of Psychologists of Quebec (Ordre des psychologues du Québec)*.

Applicants who hold a bachelor's degree but who have not met these usual requirements should consult the Graduate Program Director to determine which (if any) courses must be completed before an application can be considered. Students with insufficient preparation for graduate work may register as Special Students (undergraduate level) in the Faculty of Arts or the Faculty of Science, and follow an appropriate course of study. Such registration requires the permission of the Department but carries no advantage with respect to a student's eventual admission to graduate studies.

Applicants should note that the deadline for many scholarships and fellowships is about four months earlier than the application deadlines and that applications for scholarships and fellowships should be submitted through their home university.

All applicants must take the *GRE* General Test if they have studied in an English-speaking university. For those who have a psychology background, it is recommended to take the Subject component of the GRE. Applicants with little or no background in psychology are not required to submit scores on the Subject component of the GRE. Canadians who have not studied in an English-speaking university are not required to submit the GRE General Test and Subject component.



**Note:** Official transcripts need not be included as part of an application; they will only be requested once applicants are formally accepted into the program.

#### English Language Proficiency

For graduate applicants whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized Canadian or American (English or French) institution or from a recognized foreign institution where English is the language of instruction, documented proof of English proficiency is required prior to admission. For a list of acceptable test scores and minimum requirements, visit [mcgill.ca/gradapplicants/international/proficiency](http://mcgill.ca/gradapplicants/international/proficiency)

### 12.9.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at [mcgill.ca/gradapplicants/apply](http://mcgill.ca/gradapplicants/apply).

See [University Regulations & Resources](#) > Graduate > Graduate Admissions and Application Procedures > : [Application Procedures](#) for detailed application procedures.

#### 12.9.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Three letters of reference
- Personal Statement
- Curriculum Vitae
- Application Summary Sheet
- Graduate Record Examination (GRE) – See above for details.

For further details about these additional requirements, consult the Department of Psychology's [website](#).

### 12.9.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Psychology and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at [mcgill.ca/gps/contact/graduate-program](http://mcgill.ca/gps/contact/graduate-program).

#### Application Deadlines

**Retired**

Rhonda Amsel; B.Sc., M.Sc.(McG.) (*Associate*)

Andrew G. Baker; B.A.(Br. Col.), M.A., Ph.D.(Dal.)

M.J. Mendelson; B.Sc.(McG.), M.A., Ph.D.(Harv.)

**Professors**

M. Baldwin; B.A.(Tor.), M.A., Ph.D.(Wat.)

I.M. Binik; B.A.(NYU), M.A., Ph.D.(Penn.)

M. Dirks; B.A.(McM.), M.S., M.Phil., Ph.D.(Yale)

B. Ditto; B.S.(Iowa St.), Ph.D.(Ind.)

H. Hwang; B.A.(Chung-Ang), Ph.D.(McG.)

B. Knäuper; D.Phil.(Mannheim)

R. Koestner; B.A., Ph.D.(Roch.)

J. Lydon; B.A.(Notre Dame), M.A., Ph.D.(Wat.)

J. Mogil; B.Sc.(Tor.), Ph.D.(Calif.-LA) (*E.P. Taylor Professor of Psychology*) (*Canada Research Chair in Genetics of Pain*)

K. Nader; B.Sc., Ph.D.(Tor.) (*James McGill Professor*)

D.J. Ostry; B.A.Sc., M.A.Sc., Ph.D.(Tor.)

C. Palmer; B.Sc.(Mich.), M.Sc.(Rutg.), Ph.D.(Cornell) (*Canada Research Chair in Cognitive Neuropsychology Performance*)

M. Petrides; B.Sc., M.Sc.(Lond.), Ph.D.(Cant.)

T.R. Shultz; B.A.(Minn.), Ph.D.(Yale)

M. Sullivan; B.A.(McG.), M.A., Ph.D.(C' dia)

D. Titone; B.A.(NYU), M.A., Ph.D.(SUNY, Binghamton)

D.C. Zuroff; B.A.(Harv.), M.A., Ph.D.(Conn.)

**Associate Professors**

J. Bartz; B.A.(C' dia), M.A., Ph.D.(McG.)

J. Britt; B.A.(Colo.), Ph.D.(Balt.)

G. O'Driscoll; B.A.(Welles.), Ph.D.(Harv.) (*William Dawson Scholar*)

K. Onishi; B.A.(Brown), M.A., Ph.D.(Ill.)

S. Racine; B.Sc.(McG.), M.A., Ph.D.(Mich. St.)

J. Ristic; B.A., M.A., Ph.D.(Br. Col.) (*William Dawson Scholar*)

**Assistant Professors**

J. Axt; B.A.(Duke), M.A., Ph.D.(Virg.)

R. Bagot; B.Sc.(UNSW), Ph.D.(McG.)

C. Falk; B.Sc.(Wisc. Madison), M.A., Ph.D.(Br. Col)

J. Flake; B.Sc.(NKU), M.A.(JMU), Ph.D.(Conn.)

O. Hardt; B.Sc., M.Sc.(Trier), Ph.D.(Ariz.)

E. Hehman; B.A.(Mass.), Ph.D.(Delaware)

L. Human; B.A., M.A., Ph.D.(Br. Col.)

B. Johns; BCP(Qu.), Ph.D.(Ind.)

M. Miocevic; B.A., M.A., Ph.D.(Ariz. St.)

R. Otto; B.Sc.(Calif.-LA), Ph.D.(Texas-Austin)

M. Roy; B.Sc., Ph.D.(Montr.)

S. Sheldon; B.Sc.(Alta.), M.A., Ph.D.(Tor.)



### **Assistant Professors**

D. Vachon; B.Sc.(Tor.), M.Sc., Ph.D.(Purd.)

A. Weinberg; B.A.(Wesl.), M.A., Ph.D.(SUNY, Stony Brook) (*Canada Research Chair*)

### **Lecturer**

P. Carvajal

J. Kreitewolf

### **Professionals**

Ian F. Bradley; B.Sc., M.Sc.(Tor.), Ph.D.(Wat.) (*Assistant*)

Judith LeGallais; B.A., M.A., Ph.D.(McG.) (*Faculty Lecturer*)

James MacDoug

## Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

## Required Course

PSYC 701	(0)	Doctoral Comprehensive Examination
----------	-----	------------------------------------

## Complementary Courses

12-24 credits

12 credits (one course per term in Year 2 and Year 3) chosen from the following list:

PSYC 710	(3)	Comparative and Physiological Psychology 1
PSYC 711	(3)	Comparative and Physiological Psychology 2
PSYC 712	(3)	Comparative and Physiological Psychology 3
PSYC 713	(3)	Comparative and Physiological Psychology 4
PSYC 714	(3)	Comparative and Physiological Psychology 5
PSYC 715	(3)	Comparative and Physiological Psychology 6
PSYC 718	(3)	Learning and Motivation
PSYC 722	(3)	Personality and Social Psychology
PSYC 723	(3)	Personality and Social Psychology
PSYC 724	(3)	Personality and Social Psychology
PSYC 725	(3)	Personality and Social Psychology
PSYC 727	(3)	Personality and Social Psychology
PSYC 728	(3)	Ethics and Professional Issues
PSYC 729	(3)	Theory of Assessment
PSYC 730	(3)	Clinical Neuroscience Methods
PSYC 732	(3)	Clinical Psychology 1
PSYC 733	(3)	Clinical Psychology 2
PSYC 734	(3)	Developmental Psychology and Language
PSYC 735	(3)	Developmental Psychology and Language
PSYC 736	(3)	Developmental Psychology and Language
PSYC 740	(3)	Perception and Cognition
PSYC 741	(3)	Perception and Cognition
PSYC 742	(3)	Perception and Cognition
PSYC 743	(3)	Perception and Cognition
PSYC 744	(3)	Perception and Cognition
PSYC 746	(3)	Quantitative and Individual Differences
PSYC 747	(3)	Quantitative and Individual Differences
PSYC 748	(3)	Quantitative and Individual Differences
PSYC 749	(3)	Quantitative and Individual Differences
PSYC 752D1	(3)	Psychotherapy and Behaviour Change
PSYC 752D2	(3)	Psychotherapy and Behaviour Change
PSYC 753	(3)	Health Psychology Seminar 1

PSYC 754	(3)	Health Psychology Seminar 2
PSYC 755	(3)	Health Psychology Seminar 3
PSYC 756	(3)	Health Psychology Seminar 4

0-12 credits from the follo

**Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

**Required Courses (6 credits)**

LING 710	(2)	Language Acquisition Issues 2
PSYC 701	(0)	Doctoral Comprehensive Examination
PSYC 709	(2)	Language Acquisition Issues 1
SCSD 712	(2)	Language Acquisition Issues 4

**Complementary Courses**

15-32 credits

12 credits (one course per term in Year 2 and Year 3) chosen from the following list:

PSYC 710	(3)	Comparative and Physiological Psychology 1
PSYC 711	(3)	Comparative and Physiological Psychology 2
PSYC 712	(3)	Comparative and Physiological Psychology 3
PSYC 713	(3)	Comparative and Physiological Psychology 4
PSYC 714	(3)	Comparative and Physiological Psychology 5
PSYC 715	(3)	Comparative and Physiological Psychology 6
PSYC 718	(3)	Learning and Motivation
PSYC 722	(3)	Personality and Social Psychology
PSYC 723	(3)	Personality and Social Psychology
PSYC 724	(3)	Personality and Social Psychology
PSYC 725	(3)	Personality and Social Psychology
PSYC 727	(3)	Personality and Social Psychology
PSYC 728	(3)	Ethics and Professional Issues
PSYC 729	(3)	Theory of Assessment
PSYC 730	(3)	Clinical Neuroscience Methods
PSYC 732D1	(1.5)	Clinical Psychology 1
PSYC 732D2	(1.5)	Clinical Psychology 1
PSYC 733D1	(1.5)	Clinical Psychology 2
PSYC 733D2	(1.5)	Clinical Psychology 2
PSYC 734	(3)	Developmental Psychology and Language
PSYC 735	(3)	Developmental Psychology and Language
PSYC 736	(3)	Developmental Psychology and Language
PSYC 740	(3)	Perception and Cognition
PSYC 741	(3)	Perception and Cognition
PSYC 742	(3)	Perception and Cognition
PSYC 743	(3)	Perception and Cognition
PSYC 744	(3)	Perception and Cognition
PSYC 746	(3)	Quantitative and Individual Differences
PSYC 747	(3)	Quantitative and Individual Differences

PSYC 748	(3)	Quantitative and Individual Differences
PSYC 749	(3)	Quantitative and Individual Differences
PSYC 752D1	(3)	Psychotherapy and Behaviour Change
<del>PSYC 752D2</del>	(3)	Psychotherapy and Behaviour Change
PSYC 753	(3)	Health Psychology Seminar 1
PSYC 754	(3)	Health Psychology Seminar 2
PSYC 755	(3)	Health Psychology Seminar 3
PSYC 756	(3)	Health Psychology Seminar 4

At least 3 credits selected from the following list:

EDSL 620	(3)	Social Justice Issues in Second Language Education
EDSL 623	(3)	Second Language Learning
EDSL 624	(3)	Educational Sociolinguistics
EDSL 627	(3)	Instructed Second Language Acquisition Research
EDSL 629	(3)	Second Language Assessment
EDSL 632	(3)	Second Language Literacy Development
LING 555	(3)	Language Acquisition 2
LING 590	(3)	Language Acquisition and Breakdown
LING 651	(3)	Topics in Acquisition of Phonology
LING 655	(3)	Theory of L2 Acquisition
LING 751elopment	(3)	Advanced Seminar: Experimental 1



## 12.10 Redpath Museum

### 12.10.1 Location

Redpath Museum  
 859 Sherbrooke Street West  
 Montreal QC H3A 0C4  
 Canada  
 Telephone: 514-398-4086  
 Email: [redpath.museum@mcgill.ca](mailto:redpath.museum@mcgill.ca)  
 Website: [mcgill.ca/redpath](http://mcgill.ca/redpath)

### 12.10.2 About Redpath Museum

The Redpath Museum is a unique interdisciplinary unit within the Faculty of Science offering graduate training in research devoted to biodiversity, ecology, conservation biology, and evolutionary biology, leading to **M.Sc.** and **Ph.D.** degrees. It is an institution with extensive collections of ancient and modern organisms, minerals, and cultural artifacts. Research and teaching are centred on collections-based study, object-oriented investigation, and fieldwork. The Museum has a unique public engagement mission with large exhibit galleries and a vibrant outreach program.

### 12.10.3 Redpath Museum Admission Requirements and Application Procedures

#### 12.10.3.1 Admission Requirements

The Redpath Museum does not have its own graduate programs. All graduate students of the professors in the Redpath Museum have affiliations with either **Biology, Earth and Planetary Sciences, Anthropology, Natural Resource Sciences, or Education**. Admission requirements are subject to those home departments' regulations.

#### 12.10.3.2 Application Procedures

Students in the Redpath Museum may enrol in McGill's Department of [section 12.2: Biology](#) or other units, including the Department of [section 12.5: Earth and Planetary Sciences](#), the Department of [: Anthropology](#), the Department of [: Natural Resource Sciences](#), or the [Faculty of Education](#). Anyone interested should contact the unit concerned.

#### 12.10.3.3 Application Dates and Deadlines

For more information, please contact the Graduate Program Coordinator in the department you are interested in.

### 12.10.4 Redpath Museum Faculty

#### Director

Hans C.E. Larsson

#### Emeritus Professor

Robert L. Carroll; B.Sc.(Mich.), Ph.D.(Harv.), F.R.S.C., F.L.S.

#### Professors

David M. Green; B.Sc.(Br. Col.), M.Sc., Ph.D.(Guelph), F.L.S.

Andrew Hendry; B.Sc.(Vic., BC), M.Sc., Ph.D.(Wash.) (*joint appt. with Biology*)

Anthony Ricciardi; B.Sc.(Agr.), M.Sc., Ph.D.(McG.) (*joint appt. with Bieler School of Environment*)

#### Associate Professors

Hans C.E. Larsson; B.Sc.(McG.), Ph.D.(Chic.)

Virginie Millien; Maîtrise(Paris VI), DEA, Ph.D.(Montp.)

#### Assistant Professor

Rowan Barrett; B.Sc.(Guelph), M.Sc.(McG.), Ph.D.(Br. Col.) (*CRC Tier 2 Chair in Biodiversity Science*)

