



**Interfaculty Studies**  
**Programs, Courses and University Regulations**  
**2020-2021**



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This publication provides guidance to prospects, applicants, students, faculty and staff.

**1 .** McGill University reserves the right to mak

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## 1 Dean's Welcome

To Graduate Students and Postdoctoral Fellows:

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. We take a holistic approach to graduate student success; we support not only your academic development, but also your career-planning and professional development, and your well-being and student life. I invite you to consult the website *Resources for Your Success*, which is a one-stop-shop for the many resources and support systems in place for you across the University.

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.*

*Dean, Graduate and Postdoctoral Studies*

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## 2 Graduate and Postdoctoral Studies

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### 2.1 Administrative Officers

#### Administrative Officers

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

**Dean (Graduate and Postdoctoral Studies)**

Robin Beech; B.Sc.(Nott.), Ph.D.(Edin.)

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

France Bouthillier; B.Ed., C.Admin.(UQAM), M.B.S.I.(Montr.), Ph.D.(Tor.)

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

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

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## 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.

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## 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

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## 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.

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## 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.

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## 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 provides important information that postdoctoral scholars will require during their studies at McGill and should be periodically consulted, along with other sections and related publications.

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### 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



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## 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 [www.mcgill.ca/students/srr](http://www.mcgill.ca/students/srr) and must abide by the policies listed at [www.mcgill.ca/secretariat/policies-and-regulations](http://www.mcgill.ca/secretariat/policies-and-regulations).

Students who have been granted such a leave will have to register for the term(s) in question and their registration will show as “leave of absence” on their record. No tuition fees will be charged for the duration of the authorized leave

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## 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
- Extra-Curricular and Co-Curricular Activities
- Bookstore
- Computer Store
- Day Care

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## 11 Information on Research Policies and Guidelines, Patents, Postdocs, Associates, Trainees

Refer to [University Regulations & Resources](#) > [Graduate](#) > : [Research Policy and Guidelines](#) for information on the following:

- Regulations on Research Policy
- Regulations Concerning the Investigation of Research Misconduct
- Requirements for Research Involving Human Participants
- Policy on the Study and Care of Animals
- Policy on Intellectual Property
- Regulations Governing Conflicts of Interest
- Safety in Field Work
- Office of Sponsored Research
- Postdocs
- Research Associates

## 12.1.2 About Biological and Biomedical Engineering

Biological and Biomedical Engineering (BBME) is an interfaculty graduate program administered jointly by the Departments of Bioengineering (Faculty of Engineering) and Biomedical Engineering (Faculty of Medicine) at McGill. Through its interdisciplinary nature, the program is devised to accommodate extensive research areas and training with over 60 world-renowned scientists, as well as to equip students for promising careers in industry, healthcare, academia, and government. As researchers in this field unravel the molecular and physiological mechanisms of biology, develop increasingly advanced technologies to transform healthcare, or attempt to reverse-engineer naturally occurring biological solutions, devices, and procedures, graduates of the BBME program are poised to play a critical role in shaping our global future.

Please consult our [website](#) for additional information.

### Research Domains

Ongoing biological and biomedical engineering research at McGill includes:

- artificial cells and organs
- bioinformatics, computational biology, and biocomputation
- biological materials and mechanics
- biomedical imaging and microscopy
- biomedical modelling
- biomedical sensors, diagnostics, and therapeutics
- biomedical signals and systems
- biomolecular and cellular engineering
- bioprocess engineering
- micro- and nano-bioengineering
- systems and synthetic biology

### *section 12.1.5: Master of Engineering (M.Eng.) Biological and Biomedical Engineering (Thesis) (45 credits)*

The **Biological and Biomedical Engineering Master's program** focuses on the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. With its unique multidisciplinary environment and taking advantage of research collaborations between staff in the Faculties of Medicine, Science, and Engineering, BBME offers thesis-based graduate degrees (M.Eng.) that span broad themes, including: biomodelling, biosignal processing, medical imaging, nanotechnology, artificial cells and organs, probiotics, bioinformatics, orthopedics, biological materials and mechanobiology, motor proteins and the cytoskeleton, biosensors and biological therapeutics, biological networks, and computational biology. BBME's internationally-renowned staff provide frequent and stimulating interactions with physicians, scientists, and the biomedical industry. Through courses and thesis research, this program will prepare students for careers in industry, academia, hospitals, and government and provide a solid basis for Ph.D. studies. Candidates should hold a Bachelor's degree in engineering, science, or medicine with a strong emphasis on mathematics, physics, chemistry, and basic biology (physiology, cell biology, or molecular biology).

For more information please consult [www.mcgill.ca/bbme/prospective-students/masters-program](http://www.mcgill.ca/bbme/prospective-students/masters-program).

### *section 12.1.6: Doctor of Philosophy (Ph.D.) Biological and Biomedical Engineering*

The **Biological and Biomedical Engineering doctoral program** provides students with advanced training in the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. The program will focus on an area of choice while integrating quantitative concepts and engineering tools for the study of natural and life sciences and/or for patient care. As part of the Ph.D. requirement, students will integrate the scientific method, develop critical and deep thinking, and acquire advanced writing and presentation skills that will form the foundation for their future career. Under the guidance of their supervisor, students will tackle a research challenge and make original contributions to the advancement of science and engineering in an area of Biological and Biomedical Engineering. Through independent research and thesis writing, the program will prepare students for careers in academia, industry, hospitals, and government. Students who complete the program will obtain a doctor of philosophy in Biological and Biomedical Engineering. The best preparation for this program is a master's degree in BBME or a related discipline.

For more information please consult [www.mcgill.ca/bbme/prospective-students/doctoral-program](http://www.mcgill.ca/bbme/prospective-students/doctoral-program).

## 12.1.3 Biological and Biomedical Engineering Admission Requirements and Application Procedures

### 12.1.3.1 Admission Requirements

For up-to-date admission requirements, please consult [www.mcgill.ca/bbme/prospective-students/how-apply](http://www.mcgill.ca/bbme/prospective-students/how-apply) and [University Regulations & Resources > Graduate > Graduate Admissions and Application Procedures > : Admission Requirements \(Minimum Requirements to be Considered for Admission\)](#).

### **12.1.3.2 Application Procedures**

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

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

Please address enquiries directly to [info.bbme@mcgill.ca](mailto:info.bbme@mcgill.ca).

### **12.1.3.3 Application Dates and Deadlines**

BBME 600N1	(1.5)	Seminars in Biological and Biomedical Engineering
BBME 600N2	(1.5)	Seminars in Biological and Biomedical Engineering

### Complementary Courses (18 credits)

3 credits from the following quantitative courses:

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BIEN 570	(3)	Active Mechanics in Biology
BIEN 590	(3)	Cell Culture Engineering
BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
<del>BMDE 512</del>	(3)	<del>Finite-Element Modelling in Biomedical Engineering</del>
<del>BMDE 519</del>	(3)	<del>Biomedical Signals and Systems</del>
<del>BMDE 610</del>	(3)	<del>Functional Neuroimaging Fusion</del>
BMDE 660	(3)	Advanced MR Imaging and Spectroscopy of the Brain

6 credits from the following:

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 540	(3)	Information Storage and Processing in Biological Systems
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BIEN 570	(3)	Active Mechanics in Biology
BIEN 590	(3)	Cell Culture Engineering
BIEN 680	(4)	Bioprocessing of Vaccines
BMDE 501	(3)	Selected Topics in Biomedical Engineering
BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 504	(3)	Biomaterials and Bioperformance
BMDE 505	(3)	Cell and Tissue Engineering
BMDE 508	(3)	Introduction to Micro and Nano-Bioengineering
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
	(3)	Biomedical Signals and Systems

BMDE 660	(3)	Advanced MR Imaging and Spectroscopy of the Brain
MDPH 607	(3)	Medical Imaging

9 credits at the 500-level or higher chosen from a list on the program web site <https://www.mcgill.ca/bbme/students/courses> or from other courses, at the 500 level or higher, at least 3 credits of which have both life sciences content and content from the physical sciences, engineering, or computer science, with the prior written approval of the Thesis Supervisor and the Graduate Program Director.

#### **12.1.6 Doctor of Philosophy (Ph.D.) Biological and Biomedical Engineering**

The goal of the Biological and Biomedical Engineering Ph.D. program is for students to gain advanced training in the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. The program will focus in an area of choice while integrating quantitative concepts and engineering tools for the study of life sciences and/or for patient care. As part of the Ph.D. requirement, the student will integrate the scientific method, develop critical and deep thinking, and acquire advanced writing and presentation skills that will form the foundation for his/her career. Under the guidance of his/her supervisor, the student will tackle a research challenge and make original contributions to the advancement of science and engineering in an area of Biological and Biomedical Engineering. The program will prepare students for careers in academia, industry, hospitals and government. Students who complete the program will obtain a Doctor of Philosoph



1. Students must select an Advisory Committee, in conjunction with their thesis supervisor. This committee will consist of the thesis supervisor and two (maximum three) other individuals who will participate in discussions with students about their research program.
2. All Ph.D. students are required to complete a candidacy examination before the end of Ph.D. 3. The exam serves to evaluate the students' ability to perform original scholarship and to demonstrate their suitability for a Ph.D. degree. An M.Sc. student may be eligible to transfer to the Ph.D. program without submitting a master's thesis by taking the *Transfer Seminar/Candidacy Exam*. This exam is allowed if the master's CGPA is 3.5 or higher and if the student's Advisory Committee recommends the student as an appropriate candidate for Ph.D. studies. M.Sc. students who wish to pursue a Ph.D. degree, but who have not obtained the minimum 3.5 CGPA in their M.Sc. coursework while in the IPN, must submit a master's thesis and apply for the Ph.D. level afterwards.
3. Students are required to submit a written thesis proposal (18 months after the start of the program for M.Sc. students, and at least one month prior to the candidacy exam for Ph.D. students). This document must state the research question, present the hypothesis being tested, review

### **12.2.3.2 Application Procedures**

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

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

#### **12.2.3.2.1 Additional Requirements**

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

- Curriculum Vitae
- Personal Statement
- Letters of Recommendation (2)

Consult the Integrated Program in Neuroscience's [website](#) for further details

#### **12.2.3.3 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 IPN 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 [www](#)

### **Emeritus Professors**

M. Rasminsky; B.A.(Tor.), M.D.(Harv.), Ph.D.(Lond.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

G. Tannenbaum; M.Sc., Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

C. Thompson; D.Sc., F.C.C.P.M. (*Dept. of Neurology and Neurosurgery*)

N. White; B.A.(McG.), Ph.D.(Pitt.) (*Dept. of Psychology*)

### **Professors**

J. Antel; M.D., B.Sc.(Med.)(Manit.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

D. Arnold; B.Sc., M.D.(Cornell), F.R.C.P.(C) (*James McGill Professor*) (*Dept. of Neurology and Neurosurgery*)

M. Avoli; M.D.(Rome), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

## Professors

- S.G. Gauthier; B.A., M.D.(Montr.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)
- B. Giros; M.Sc., Ph.D.(Paris VI) (*Dept. of Psychiatry*)
- I. Gold; B.A.(McG.), Ph.D.(Princ.) (*Dept. of Psychiatry*)
- J. Gotman; M.Eng.(Dart.), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)
- A. Gratton; Ph.D.(C' dia) (*Dept. of Psychiatry*)
- J. Grodzinsky; Ph.D.(Brandeis) (*Dept. of Linguistics*)
- D. Guitton; Dipl. IVK(Univ. Libre de Brux.), B.Eng., M.Eng., Ph.D.(Eng.), Ph.D.(Physiol.)(McG.) (*Dept. of Neurology and Neurosurgery*)
- D. Haegert; M.D.(Br. Col.), F.R.C.P.(C) (*Dept. of Pathology*)
- E. Hamel; B.Sc.(Sher.), Ph.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)
- K. Hastings; B.Sc., Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)
- R.T. Hepple; Ph.D.(Tor.) (*Dept. of Kinesiology and Physical Education*)
- R. Hess; Ph.D.(Melb.), D.Sc.(Aston, UK) (*Dept. of Ophthalmology*)
- R. Joober; M.D.(Tunisia), Ph.D.(McG.) (*Dept. of Psychiatry*)
- D. Juncker; Dipl., Ph.D.(Neuchâtel) (*Dept. of Biomedical Engineering*)
- T. Kennedy; B.Sc.(McM.), Ph.D.(Col.) (*Dept. of Neurology and Neurosurgery*)
- S. King; B.A.(McG.), M.Ed., Ed.S.(James Madison Univ.), Ph.D.(Virginia Tech) (*Dept. of Psychiatry*)
- F. Kingdom; Ph.D.(Reading) (*Dept. of Ophthalmology*)
- P. Lachapelle; Ph.D.(Montr.) (*Dept. of Ophthalmology*)
- N. Lamarche; Ph.D.(Montr.) (*Dept. of Anatomy and Cell Biology*)
- M. Lepage; B.A.(C'

## Professors

M. Petrides; B.Sc., M.Sc.(Lond.), Ph.D.(Cant.) (*James McGill Professor*) (*Depts. of Neurology and Neurosurgery, Psychology*)

G. Plourde; M.D.(Laval), M.Sc.(Ott.) (*Dept. of Anesthesia*)

J. Poirier; Ph.D.(Montr.) (*Dept. of Psychiatry and Medicine*)

A. Ptito; Ph.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

N. Rajah; Ph.D.(Tor.) (*Dept. of Psychiatry*)

Y. Rao; B.Sc.(Sichuan), Ph.D.(Tor.) (*Dept. of Neurology and Neurosurgery*)

A. Ribeiro-da-Silva; M.D., Ph.D.(Porto) (*Dept. of Pharmacology and Therapeutics*)

G. Rouleau; M.D.(Ott.), Ph.D.(Harv.), F.R.C.P.(C), F.R.S.C. (*Dept. of Neurology and Neurosurgery*)

E. Ruthazer; A.B.(Princ.), Ph.D.(Calif.-SF) (*Dept. of Neurology and Neurosurgery*)

A. Sadikot; M.D.,C.M.(McG.), Ph.D.(Laval), F.R.C.S.(C) (*Dept. of Neurology and Neurosurgery*)

H.U. Saragovi; Ph.D.(Miami) (*Dept. of Pharmacology and Therapeutics*)

H. Schipper; M.D., Ph.D.(McG.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

G. Sebire; M.D., Ph.D.(Paris VI) (*Dept. of Pediatrics*)

P. Seguela; Doct. 3e Cycle(Bord.), Ph.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

M. Shevell; B.Sc., M.D.(Vanderbilt) (*Dept. of Neurology and Neurosurgery*)

E. Shoubridge; M.Sc., Ph.D.(Br. Col.) (*Dept. of Neurology and Neurosurgery*)

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## Associate Professors

B. Chen; Ph.D.(SUNY) (*Dept. of Neurology and Neurosurgery*)

J.-F. Cloutier; B.Sc.(C' dia), Ph.D.(McG.) (*Depts. of Neurology and Neurosurgery, and Anatomy and Cell Biology*)

E. Cook; B.Sc.(Ariz. St.), M.Sc.(Rice), Ph.D.(Baylor) (*Dept. of Physiology*)

A. Dagher; M.Eng.(McG.), M.D.(Tor.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

B. Debruille; M.D.(Paris XI), Ph.D.(Paris VI) (*Dept. of Psychiatry*)

C. Ernst; B.Sc.(McG.), M.Sc.(Br. Col.), Ph.D.(McG.) (*Dept. of Psychiatry*)

B. Frauscher; M.D., Ph.D. (*Dept. of Neurology and Neurosurgery*)

G. Gobbi; M.D., Ph.D. (*Dept. of Psychiatry*)

R. Gruber; Ph.D.(Tel Aviv) (*Dept. of Psychiatry*)

P. Haghighi; Ph.D.(McG.) (*Dept. of Physiology*)

M. Kaminska; M.D., M.Sc. (*Dept. of Experimental Medicine*)

A. Kania; Ph.D.(Baylor) (*Depts. of Biology, Anatomy and Cell Biology, and Experimental Medicine*)

D. Klein; B.A., Ph.D.(Witw./S. Af.) (*Dept. of Neurology and Neurosurgery*)

M. Kokoeva; Ph.D.(Russian Acad. Of Sci.) (*Dept. of Medicine*)

N. Ladbon-Bernasconi; M.D.(Lausanne), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

A. Lamontagne; Ph.D.(Laval) (*School of Physical and Occupational Therapy*)

N. Mechawar; Ph.D.(Montr.) (*Dept. of Psychiatry*)

J. Mendola; Ph.D.(MIT) (*Dept. of Ophthalmology*)

G. Mitsis; Dipl.(Nat. Tech., Athens), M.Sc., Ph.D.(USC) (*Dept. of Bioengineering*)

A. Nadig; Ph.D. (*School of Communication Sciences and Disorders*)

M. Oskoui; M.D., M.Sc. (*Dept. of Pediatrics*)

H. Paudel; Ph.D.(Okla.), M.Sc.(Nepal) (*Dept. of Neurology and Neurosurgery*)

### **Associate Professors**

P. Wintermark; M.D.(Lausanne) (*Dept. of Pediatrics*)

T.P. Wong; Ph.D.(McG.) (*Dept. of Psychiatry*)

S.C. Woolley; B.Sc.(Duke), Ph.D.(Texas-Austin) (*Dept of Biology*)

L. Xiong; Ph.D.(McG.)

J. Zhang; M.D.(Shanghai II Medical U.), M.Sc. (Paris XI), Ph.D. (Laval) (*Dept. of Neurology and Neurosurgery*)

### **Assistant Professors**

G. Armstrong; M.Sc., Ph.D.(Qu.) (*Dept. of Neurology and Neurosurgery*)

N. Auclair Oullet; B.A., M.Sc., Ph.D.(Laval) (*School of Communication Sciences and Disorders*)

R. Bagot; Ph.D.(McG.) (*Dept. of Psychology*)

M. Berlim; M.D., M.Sc.(UFRGS) (*Dept. of Psychiatry*)

B. Bernhardt; Ph.D.(McG.) (

## Assistant Professors

A. Kostikov; Ph.D.(Georgia) (*Dept. of Neurology and Neurosurgery*)

A. Krishnaswamy; Ph.D.(McG.) (*Dept. of Physiology*)

G. Leonard; Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

J. Marcoux; M.Sc., M.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

M. O. Martel; Ph.D. (*Dept. of Anesthesia*)

A. Milnerwood; B.Sc (Hertfordshire), Ph.D.(Open, UK) (*Dept. of Neurology and Neurosurgery*)

B. Mistic; B.Sc., M.A., Ph.D.(T



**Adjunct Professors**

O. Overbury; Ph.D.(C' dia) (*Dept. of Ophthalmology*)

**12.2.5 Master of Science (M.Sc.) Neuroscience (Thesis) (45 credits)****Required Courses (36 credits)**

NEUR 696	(6)	Master's Thesis Research
NEUR 697	(9)	Master's Thesis Proposal
NEUR 698	(9)	Master's Seminar Presentation
NEUR 699	(12)	Master's Thesis Submission
NEUR 705	(0)	Responsible Research Conduct

**Complementary Courses (9 credits)**

3 credits from the following:

NEUR 630	(3)	Principles of Neuroscience 1
NEUR 631	(3)	Principles of Neuroscience 2

And 6 credits in other courses at the 500 level or higher that are relevant to the program.

Upon recommendation, depending upon their particular background and needs, students may be requested to take additional selected courses at the 500 level or higher.

Note: All M.Sc.-level students must register for a minimum of 12 credits per term during the first three terms of their master's program.

**12.2.6 Doctor of Philosophy (Ph.D.) Neuroscience**

Students with an M.Sc. degree continuing in this Department will receive credit exemptions for graduate coursework accomplished (including NEUR 630 or NEUR 631). It may be recommended that they take specialty courses related to their field of study in neuroscience. Students with an M.Sc. degree from another program will be required to take NEUR 630 and NEUR 631 and/or other courses listed under the M.Sc. degree depending upon their background and field of study.

Students with an M.D. degree proceeding directly into a Ph.D. program will be required to take NEUR 630 and NEUR 631. They will also be required to take 6 credits of graduate-level courses.

**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)**

NEUR 630	(3)	Principles of Neuroscience 1
NEUR 631	(3)	Principles of Neuroscience 2
NEUR 700	(0)	Doctoral Candidacy Examination
NEUR 705	(0)	Responsible Research Conduct

**Complementary Courses (6 credits)**

6 credits at the 500, 600, or 700 level, approved by the graduate program adviser.

## 12.3 Quantitative Life Sciences

### 12.3.1 Location

Telephone: 514-398-4826

Email: [coordinator.qls@mcgill.ca](mailto:coordinator.qls@mcgill.ca)

Website: [www.mcgill.ca/qls](http://www.mcgill.ca/qls)

### 12.3.2 About Quantitative Life Sciences

Quantitative Life Sciences is the broad application of mathematical, computational, and other quantitative methods to study biological systems at all scales—from single molecules to the environment. It is part of a rapidly expanding field that includes such specializations as systems biology, bioinformatics, biophysics, medical informatics, computational biology, computational pharmacology, computational neuroscience, and mathematical biology.

#### *section 12.3.5: Doctor of Philosophy (Ph.D.) Quantitative Life Sciences*

Please refer to the [QLS website](#) for further details.

### 12.3.3 Quantitative Life Sciences Admission Requirements and Application Procedures

#### 12.3.3.1 Admission Requirements

##### General

Applicants are expected to hold an undergraduate degree in one of the following areas (or equivalent): biology, chemistry, physiology, genetics, engineering, computer science, mathematics, statistics, physics, or chemistry.

Applicants must have a strong quantitative background. Such a background may be obtained by having at least the equivalent of a minor in computer science, mathematics, statistics, physics, chemistry, or engineering.

Applicants who do not have a formal education in life sciences need to have a demonstrated interest for that field, for example in the form of an undergraduate research project or the completion of life-science courses.

Applicants are expected to have attained a high scholastic standing equal to, or greater than, the minimum Cumulative Grade Point Average of 3.3 (out of 4.0 at McGill University) in **all** levels of study.

Applicants to graduate studies whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone), must submit results of the *TOEFL* exam with their application and have a minimum score of 86 on the Internet-based test (iBT; 567 on the paper-based test [PBT]) with each component score not less than 20. Further information on English proficiency requirements is available at [www.mcgill.ca/gradapplicants/international/apply/proficiency](http://www.mcgill.ca/gradapplicants/international/apply/proficiency).

#### 12.3.3.2 Application Procedures

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

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

#### 12.3.3.2.1 Additional Requirements

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

- Curriculum Vitae
- Personal Statement
- Research Statement
- Two reference letters
- Copy of official transcripts

#### 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 Quantitative Life Sciences 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 [www.mcgill.ca/gps/contact/graduate-program](http://www.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 15	June 1	June 1	
<b>Winter Term:</b>	N/A	N/A	N/A	N/A	
<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.

### 12.3.4 Quantitative Life Sciences Faculty

#### Director

C. Greenwood

#### Professors

S. Baillet (*Dept. Neurology and Neurosurgery*)

C. Baker (*Dept. of Ophthalmology & Visual Sciences*)

D. Bowie (*Dept. of Pharmacology and Therapeutics*)

A. Evans (*Dept. of Neurology and Neurosurgery*)

G. Fussman (*Dept. of Biology*)

K. Gehring (*Dept. of Biochemistry*)

L. Glass (*Dept. of Physiology*)

C. Greenwood (*Dept. of Epidemiology, Biostatistics and Occupational Health*)

P Grutter (*Dept. of Physics*)

E. Gruber (*Dept. of Psychology*)

H. Hwang (*Dept. of Psychology*)

D. Juncker (*Dept. of Biomedical Engineering*)

M. Lathrop (*Dept. of Human Genetics*)

L. Levin (*Depts. of Ophthalmology, Neurology and Neurosurgery*)

K. Murai (*Dept. of Neurology and Neurosurgery*)

E. Ruthazer (*Dept. of Neurology and Neurosurgery*)

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## Associate Professors

M. Chacron (*Dept. of Physiology*)  
E. Cook (*Dept. of Physiology*)  
K. Dewar (*Dept. of Human Genetics*)  
P. Francois (*Dept. of Physics*)  
P. Harrison (*Dept. of Biology*)  
R. Hernandez (*Dept. of Human Genetics*)  
T. Humphries (*Depts. of Physiology, Mathematics and Statistics*)  
A. Khadra (*Dept. of Physiology*)  
S. Komarova (*Faculty of Dentistry*)  
B. Leung (*Dept. of Biology, School of Environment*)  
J. Majewski (*Dept. of Human Genetics*)  
N. Moitessier (*Dept. of Chemistry*)  
E. Moodie (*Dept. of Epidemiology, Biostatistics and Occupational Health*)  
R. Nadon (*Dept. of Human Genetics*)  
C. Pack (*Dept. of Neurology and Neurosurgery*)  
T. Pastinen (*Dept. of Human Genetics*)  
J. Pineau (*Dept. of Computer Science*)  
J.B. Poline (*Dept. of Neurology and Neurosurgery*)  
B. Richards (*Dept. of Biology*)  
A. Schmidt (*Dept. of Epidemiology, Biostatistics and Occupational Health*)  
R. Sladek (*Depts. of Experimental Medicine, Human Genetics*)  
J. Vogel (*Dept. of Biology*)  
J. Waldispü

### Assistant Professors

J. Vargas (*Dept. of Anatomy and Cell Biology*)

I. Watson (*Dept. of Biochemistry*)

S. Weber (*Dept. of Biology*)

J. Xia (*Dept. of Animal Science, Inst. of Parasitology*)

### 12.3.5 Doctor of Philosophy (Ph.D.) Quantitative Life Sciences

#### Required Courses (6 credits)

QLSC 600D1	(3)	Foundations of Quantitative Life Sciences
QLSC 600D2	(3)	Foundations of Quantitative Life Sciences
QLSC 601D1	(0)	Quantitative Life Sciences Seminars 1
QLSC 601D2	(0)	Quantitative Life Sciences Seminars 1
QLSC 602D1	(0)	Quantitative Life Sciences Seminars 2
QLSC 602D2	(0)	Quantitative Life Sciences Seminars 2
QLSC 603D1	(0)	Quantitative Life Sciences Seminars 3
QLSC 603D2	(0)	Quantitative Life Sciences Seminars 3
QLSC 701	(0)	Ph.D. Comprehensive Exam

#### Complementary Courses

9-11 credits

Students will be required to take one or two courses from each of the Quantitativ

**Computational and Statistical Molecular Biology Stream**

## Quantitative

BIOS 601	(4)	Epidemiology: Introduction and Statistical Models
BMDE 502	(3)	BME Modelling and Identification
COMP 551	(4)	Applied Machine Learning
COMP 561	(4)	Computational Biology Methods and Research
COMP 598	(3)	Topics in Computer Science 1
HGEN 677	(3)	Statistical Concepts in Genetic and Genomic Analysis
MATH 523	(4)	Generalized Linear Models
MATH 533	(4)	Honours Regression and Analysis of Variance
MATH 680	(4)	Computation Intensive Statistics
MATH 682	(4)	Statistical Inference
QLSC 611	(3)	Directed Readings

## Life Sciences

BIOC 603	(3)	Genomics and Gene Expression
BIOL 551	(3)	Principles of Cellular Control
EXMD 602	(3)	Techniques in Molecular Genetics
HGEN 661	(3)	Population Genetics
HGEN 692	(3)	Human Genetics
PHAR 503	(3)	Drug Discovery and Development 1
PHAR 505	(3)	Structural Pharmacology
QLSC 611	(3)	Directed Readings

**Ecosystems Stream**

## Quantitative

ENVB 506	(3)	Quantitative Methods: Ecology
MATH 523	(4)	Generalized Linear Models
MATH 525	(4)	Sampling Theory and Applications
MATH 533	(4)	Honours Regression and Analysis of Variance
MATH 537	(4)	Honours Mathematical Models in Biology
MATH 547	(4)	Stochastic Processes
MATH 556	(4)	Mathematical Statistics 1
MATH 682	(4)	Statistical Inference
QLSC 611	(3)	Directed Readings

## Life Sciences

BIOL 509	(3)	Methods in Molecular Ecology
BIOL 510	(3)	Advances in Community Ecology
BIOL 540*	(3)	Ecology of Species Invasions
BIOL 594	(3)	Advanced Evolutionary Ecology

ENVR 540*	(3)	Ecology of Species Invasions
QLSC 611	(3)	Directed Readings

\* Students either choose BIOL 540 or ENVR 540 but not both.

